



**SWIFTLOCK
SECURE-TOUCH+
TOUCHSCREEN**

**VACUUM
STERILIZER**



**FRONT-LOADING
Versions**

80 to 300 Litre

Instruction Manual

**INSTALLATION
OPERATION
MAINTENANCE
FAQ**

B&R Controller

Part No MXN738 issP01 ed 1

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For the associated
“CONTROL SYSTEM PROGRAMMING MANUAL ”
See Part No. MXN701
(MXN701-1 PLC B&R controller User Manual iss01.pdf)

CE 0120 (MDD)

CE 0353 (PED)

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The “**SWIFTLOCK SECURE-TOUCH +**” Touchscreen CLASSIC Sterilizer models are modern, functional Benchtop or Floorstanding Autoclave/Sterilizers designed with ease of use in mind . They use a rapid-action “**NEW SWIFTLOCK**” closure system to give easy and rapid opening of the chamber, together with a 5 or 10 Cycle Touchscreen operated control system, to facilitate a variety of uses .



WARNING IEC61010

In accordance with IEC61010

The safety features and protection for the operator in this equipment are only designed to operate when the equipment is used in the way described in these instructions. & if used in any way not specified such protection may be impaired.

GENERAL OPERATION & LOG-BOOK

Although the safety record of laboratory Sterilizers is good, remember at all times that they store considerable potential energy, and should be treated with respect and care . If correctly used and cared for, your Sterilizer will give you long and safe service .

Pay proper attention to regular maintenance . Never force the locking mechanism, or operate the machine with any leaks, or incorrectly operating parts.

Report any defects to your Supervisor . If deterioration or defects are noticed, record them in a log book and contact our Service Department .

Record also the results of annual and periodic inspections . Every 4 to 6 weeks is recommended. Check the logbook before you start using the machine, as someone else may have recorded a fault of which you are not aware.

DOCUMENT ISSUES AND DETAILS

Date & MR no	Issue & Edition	Filename	Detailsof changes and revisions + software issues & notes
	P01 ed A	mxn738-p01ed a B&R #5-10 Vacuum basic.doc	Original issue Vacuum #5-10 B&R

SAFETY VALVE TESTING

**This machine contains a Safety Valve
(PRESSURE RELIEF SAFETY VALVE)**

To comply with typical safety regulations this must be kept in a serviceable condition and it must also be regularly tested. Test periods depend upon local regulations , however ;-

Astell Scientific advise that the Safety Valve should be tested every 3 months.

A special SAFETY VALVE TEST CYCLE is provided to make this easier, accessed from the ENGINEER level.

Safety valve Position

The Safety Valve is situated in different positions depending upon model specification and size. & is mounted at the rear or the side discharging downwards in a position allowing access for serviceing

All models – have an Automatic Safety Valve Test Warning System and monitor the date of the last Safety Valve Test Cycle.

At Power-On & Cycle Start the system checks the current date and shows a warning after the 3 month period has elapsed,

Note that this period is fixed to meet the requirements of most countries for Steam Safety Valve Testing.

The only way to cancel this warning is to run a Safety valve Test Cycle.

CALIBRATION POINTS

The Safety Valve Test Cycle is designed to also provide for an engineer to carry out calibration at 121C and 134C . This requires Precision Thermometer equipment, and is normally done as part of the Calibration Schedule, which is Not the same as the 3 month Safety valve Test Schedule.

During the routine Safety Valve test just click on the [TICK] to move past the 121C and 134C stages on to the actual safety valve test

For Full details see page xxx

Safety Valve Test Quick Reference

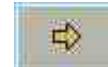
IMPORTANT *
THE MACHINE MUST BE ATTENDED AT ALL TIMES UNTIL TEST IS COMPLETED.

TOUCH



SELECT "SETTINGS"

TOUCH



SELECT "SITE ENGINEER"
ENTER "33333"

SELECT "EDIT MACHINE SETTING"

SELECT "TEST CYCLE"
(**Background Turns Green**)

TOUCH



(3 Times = Return To Main Menu)

CLOSE & LOCK DOOR

TOUCH "START"



SELECT "TEST CYCLE" ON MENU

TOUCH "START"
(To Start Cycle)



TEST CYCLE IS NOW RUNNING

Follow prompts on display. At 121c & 134c Points ,touch []. When steam is seen coming from the safety-valve outlet, touch [] to advance machine into cooling.

Note- depending on model the safety valve may operate by exhausting a blast of steam or by a continuous steam flow thro the valve

**LEAVE UNTIL COMPLETE
& THEN OPEN DOOR**

IF THE SAFETY VALVE DOES NOT OPERATE AT THE STATED PRESSURE IT MUST BE CHECKED AND ADJUSTED BY A QUALIFIED ENGINEER.

ELECTRICAL FIRE RISK

This equipment contains electrical circuitry which carries sufficient energy to cause and sustain a fire . Active system Thermal energy-input protection & Over-current protection is provided on all appropriate circuits. A Safety-Valve prevents excessive pressure build-up. The Sterilizer is protected from overheating by an electrical Thermal Cut-out sensing Boiler Temperature. Temperatures due to the Designed Heat Source(s) in extreme fault conditions (ie; not inc. fire) could exceed 150C internal to the Chamber / boiler. The user must satisfy himself that the equipment is suitable to process the load.

This equipment should be sited & operated on a heat-proof , non-combustible waterproof surface.

CLIMATIC CONDITIONS

The following details are provided in accordance with iso EN601010

STORAGE

Storage of this product in cold or damp conditions may lead to a Hazard or operating faults if the equipment is put into service before it has dried out and achieved equilibrium with the surroundings of the operating site.

Place in the area where it is intended to use the equipment .

Do NOT connect to a power supply.--Allow 48 Hrs to reach Humidity Equilibrium.

CLIMATIC SPECIFICATIONS

OPERATING

Permitted Humidity not exceeding 75% mean non-condensing.

Permitted Temperature range 0-40 C

Do not site the equipment in an area where there are significant quantities of dust. this will gather on the electronics and cause malfunction.

Do not site the equipment in an area where Spray or fumes from other equipment may touch the cabinet or cooling vents.

STORAGE

Permitted Temperature range -10 / +70 C

Humidity not specified but an equalising time is required- see above.

BATTERY BACKUP

Data Backup - Main system and Cycle memory
Via FLASH memory

Data settings & Realtime Clock
REPLACEABLE lithium
CR2477 battery in Screen Unit

Observe local Environmental Disposal Rules if battery is replaced.

ELECTRICAL FIRE RISK

This equipment contains electrical circuitry which carries sufficient energy to cause and sustain a fire . Active system Thermal energy-input protection & Over-current protection is provided on all appropriate circuits. A Safety-Valve prevents excessive pressure build-up. The Sterilizer is protected from overheating by an electrical Thermal Cutout sensing Boiler Temperature. Temperatures due to the Designed Heat Source(s) in extreme fault conditions (ie; not inc. fire) could exceed 150C internal to the Chamber / boiler. The user must satisfy himself that the equipment is suitable to process the load.

This equipment should be sited on a heat-proof , non-combustible waterproof surface.

HANDLING/MOVING

Information provided in accordance with IEC61010 in advisory form only- User must carry out all operations including moving/handling this equipment in accordance with health and safety regulations & Observe all Manual Handling regulations... No liability accepted by the Manufacturers or their agents for loss or injury or consequential damage /injury howsoever caused by the handling/moving of this equipment.

This equipment is heavy, not portable and is not provided with lifting handles.

If in doubt, Remove sidepanels before lifting Lift at sides or rear of case, taking the load of the unit on the internal structure. Do not lift or handle using the Plastic Door cover or Control Panel or any other projection. Do not drag across surfaces or the Feet may be damaged.. Do not adjust Feet on frontload models- these are fixed to tilt the machine backwards

POSITIONING & LOCATION

The equipment should be placed on a suitable surface and levelled before use. This must allow the door or cover to open unobstructed, and will permit the chamber to be operated and loaded by the operator whilst complying with local regulations regarding lifting and manual handling - Please see "HANDLING" instructions.

The equipment should be positioned so that the Power switch (the Push-To-Stop switch) is unobstructed and easily accessible from the operating position (in front of the equipment).

Failure to comply with these positioning requirements when installing this machine may result in refusal of service or extra charges being incurred during service (including even warranty visits) if the resulting position makes service access difficult or the unit is affected by walls or other equipment.

DISTANCE FROM WALLS

THIS MACHINE WILL REQUIRE SPACE FOR SERVICE ACCESS .

This is carried out from both sides and the rear.

Absolute Minimum Requirements:-

- Leave 400mm clearance either side and 500mm at the rear.
- Do Not build into benches or alcoves.
- Do Not position either side or back up against a wall.
- Do Not site other equipment close to either side or the rear.
- Do not cover or obstruct Cooling vents.
- Do not place objects on top of the equipment.
- They may Be Damaged By The Heat!!

DISCLAIMER

The manufacturers or their agents cannot accept responsibility for damage that may be caused by pressurised supplies & inlet gases, exhaust gases , water or condensate should the machine be operated other than in accordance with the instructions in the provided operating manuals, or if the Pipework system is modified, misused, blocked or obstructed, or by use of non-approved alternative spare parts . Astell Scientific are not liable for the performance of or problems or damage cause d by pipework and supplies which are installed by third parties out of the control of Astell Scientific..

INSTALLATION

POWER, WATER & DRAINAGE

Air, WATER , STEAM ,DRAINAGE SERVICES & CONNECTIONS.

Compressed Air Supply

This machine requires a compressed air supply

This is connected via a 6mm Plastic air line at the rear of the machine.

The air must be Dry, and Oil-Free

Air Pressure

Minimum=

Maximum=

Flow Rate =

PIPEWORK CONNECTIONS.

A] EXHAUST

The exhaust outlet will produce steam and condensate. Connect the outlet pipe to a suitable drain using the largest pipe bore available, provided with a suitable air vent to the outside above the level of the machine to vent the exhaust steam, and to avoid air locks which may result in contaminated effluent being drawn back during cooling.

Pipework Temperature Capability

The drainage pipework must be capable of carrying condensate at temperatures up to about **60C**,

Note- If the pipework will not withstand the temperatures involved the manufacturer cannot accept responsibility for any damage that may be caused by hot exhaust gases or condensate. (see below.)

B] EXHAUST VENT

Separate Vent is strongly advised , but where no separate vent-pipe can be provided, the connection to the drain must include an air-break to avoid back-suction.

C] SAFETY VALVE

The Safety-Valve exhausts vertically downwards at the rear of the machine close to the floor. When it operates a large volume of low-velocity steam will be produced .

The Safety-Valve must not be connected to any other pipework or altered in any way.

Please see other references in this manual to SAFETY-VALVE TESTING.

D] AIR INLET / FILTER

This fitted into a screwed inlet socket sited behind the machine panelwork .

Replacement filters are available from Astell.

E] BLOWDOWN VALVE

(models with internal Steam generator only) The BLOWDOWN VALVE permits the STEAM GENERATOR BOILER to be drained and also to be blown down to remove scale and debris for cleaning purposes. This is at the rear of the autoclave fitted with a lever action hand-valve. The valve is shut when the handle is at RIGHT-ANGLES to the pipe.

This MUST be connected to Either;-

- 1 A suitably designed BLOWDOWN VESSEL
- 2 An external blowdown pipe exhausting to free air, above a drain . This will produce large volumes of high temperature steam so protection must be arranged to avoid injury or scalding to nearby people.

The valve has a Key Lockable Head

The key should be kept in a secure place as this valve may be a hazard if used incorrectly .

Please note that regular blowing-down is necessary to preserve Boiler Operation.

F] STEAM INLET..**Direct-Steam Heated Models Only**

This is a 3/8" BSP Screwed Gun-Metal Union. The steam supply is routed through a Steam trap and Pressure Reducing Valve before it is fed to the inlet

Pressure Reducing Valve

The autoclave is **NOT** fitted internally with a **PRV**, and steam supply pressure must be reduced to 3.04 Bar maximum.[44 P.S.I.G /304 kPa) with a suitable Pressure Reducing Valve before reaching the autoclave.

It is important to fit a pressure gauge into this supply line, after the pressure reducing valve, which will indicate actual steam pressure available to the machine .

A condensate draining steam trap must be fitted **between the PRV & Autoclave, immediately upstream of the Autoclave**, to remove all condensate as Free Water will stop Sterilizing action.

Steam Supply Problems:-

A common fault with installations is that long pipe runs, poor layout or poor steam quality fill the autoclave Chamber up with water. This will be avoided if attention is paid to Condensate separation. Ensure that the steam supply flow is adequate to feed the machine when operating - The steam pressure in the line will fall when the machine is HEATING UP or FREESTEAMING.

F] SUPPLY CONDENSATE RETURN**Steam Heated Models Only**

The steam Supply line must be properly installed. If provision is not made to automatically drain off the condensate that forms in the supply line the autoclave will draw in large quantities of water. & this will stop the Sterilising action, and may cause damage.

Warning ; On new steam systems or those that have cooled beware condensate build-up in lines which may cause water hammer & damage valves and instruments. Correct installation and Steam Trap arrangements will avoid this.

G] DRIP-TRAY DRAIN

(, Not present on Vertical models. Fitted only to Front-Load models)

This is a separate plastic pipe 13mm internal bore, emerging from the rear of the machine. This carries away water that trickles into the driptray beneath the door. It should be led to a suitable drain (Below the level of the Driptray.) Do not connect to the Autoclave drain, without a trap or suitable U-Bend or similar, as this may cause hazardous blow-backs if pressure develops in the drain . As this water is generally fairly clean, a simple loose connection to a separate drain will suffice or a bucket or container may beadequate if drainage cannot be arranged..

H] MAINS WATER INLET

This is a 3/4RP male inlet . It can be connected using a Plastic washing-machine type Hose with a 3/4" BSP (3/4 RP) Female Threaded tap connector as for a Washing Machine Inlet.

This should be connected to a Cold Water Mains Supply ,

Max Temp 25C

Minimum pressure. 0.3 Bar ,

Maximum pressure. 6 Bar

Note supply must provide at least 20 litres/minute flow rate.

Important- water temperature For the water-ring vacuum pump and vacuum Physics generally that the ability of the pump to create a vacuum is dependant on the water temperature inside the pump. The vacuum cannot better than the saturated vapour pressure for water at that temperature.

Astell specify a water temperature at the inlet of 25C or less. Although the system can be made to work at temperatures up to 30C it will require reprogramming and the effectiveness of the cycle is considerably reduced.

L] TANK OVERFLOW (warning pipe)**AUTOFILL option**

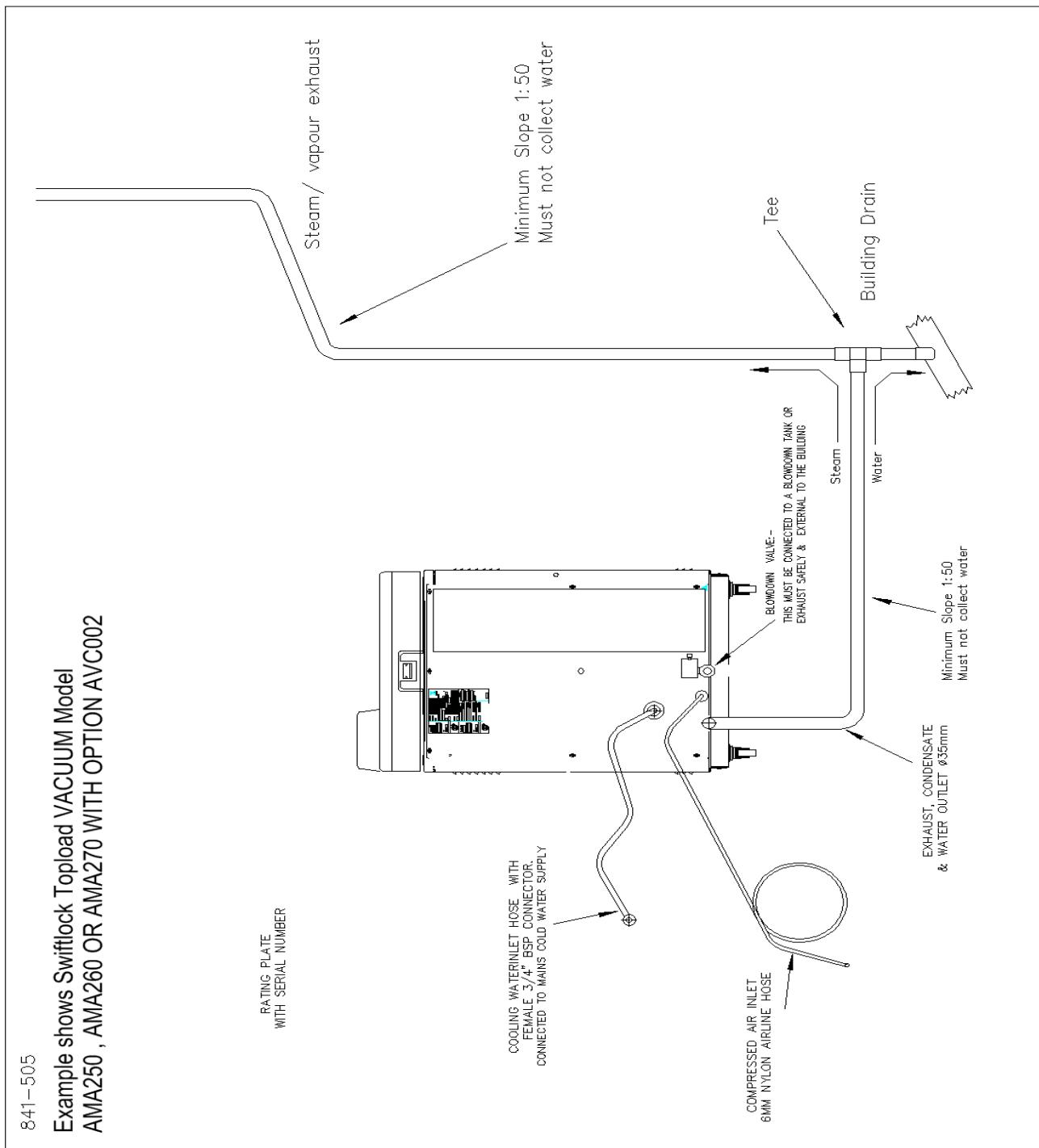
This is a White Polypropylene 20mm pipe or on some models a 22 mm copper pipe which projects from the rear of the machine .

This will carry overflow water if the Level in the Autofill tank is too high. It should be fed to an visible open Tundish or drain.;- U.K. Water Research Council and the U.K. water byelaws require Warning pipe outlets to be visible to the operator.

PIPEWORK INSTALLATION NOTES

AUTOCLAVES 80-300 Litres INTERNAL STEAM GENERATOR Top loading and Front-loading models

The correct performance of this machine requires that it is installed in accordance with the instruction manual provided . This information is supplied for additional guidance.
 The autoclave shown is an example only & does not represent any particular model.
 All pipework positions are typical only and may differ from model to model.
 All connections are labelled for identification.



EXHAUST VENT

This MUST be routed to the outside of the building or to a purpose-designed extraction system to remove the steam outflow. It Must be free-venting & installed with a slope minimum 1:50 so that it is self-draining along the whole length to prevent blockage by water.

Note- on special models the Exhaust may be sited higher up than shown.

DRIPTRAY DRAIN

Frontload models have a flexible PVC tube exiting at the rear. This carries the drip tray waste which may collect from runoff from the door inside surface when the door is opened. It should be routed to a building drain. Where this is the same drain as the exhaust a u-bend or trap must be fitted in line with this pipe to prevent steam pressure in the drain causing backflow up to the drip tray.

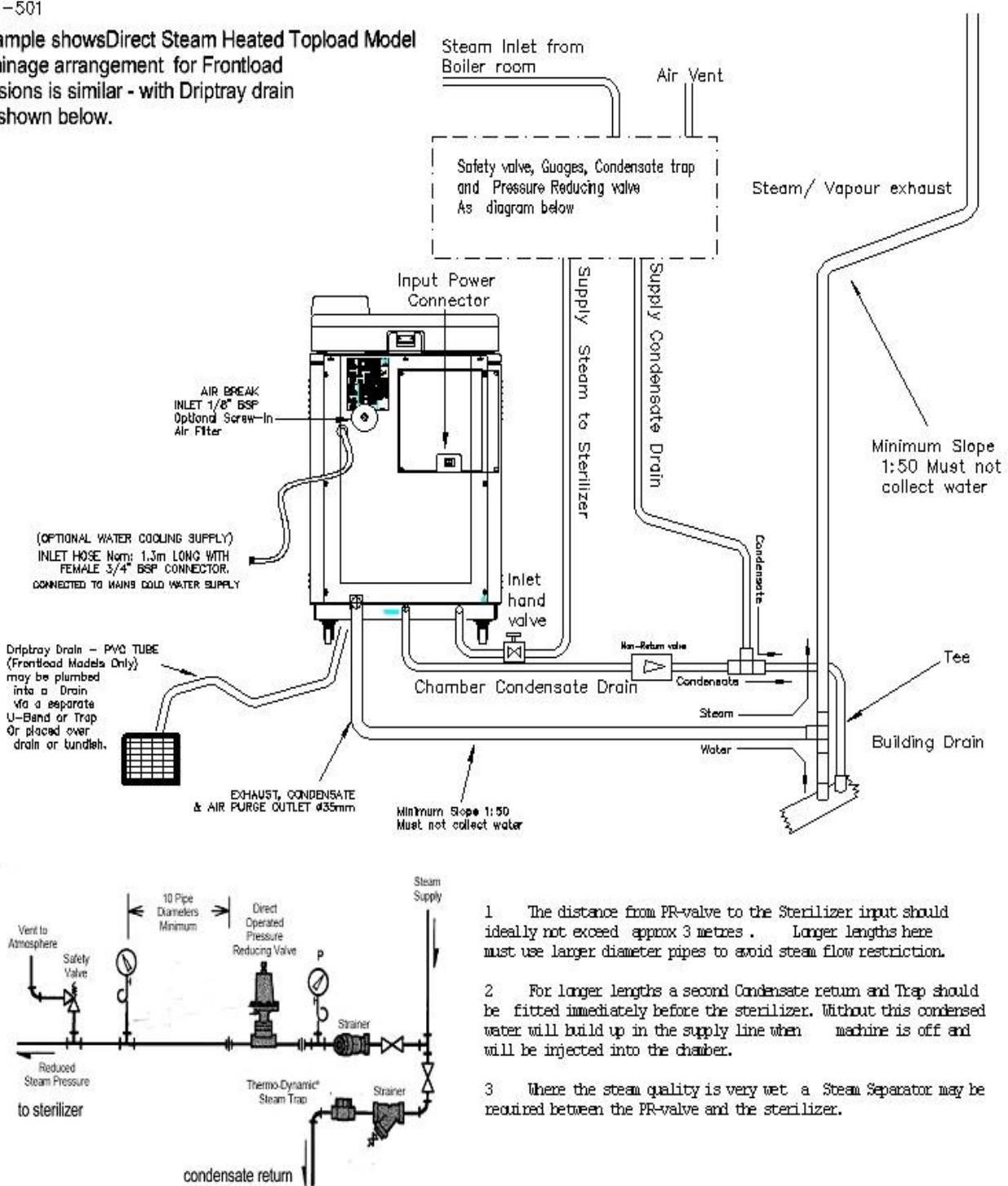
PIPEWORK INSTALLATION NOTES

AUTOCLAVES 80-300 Litres Direct Steam Heated Top loading and Front-loading models

841-501

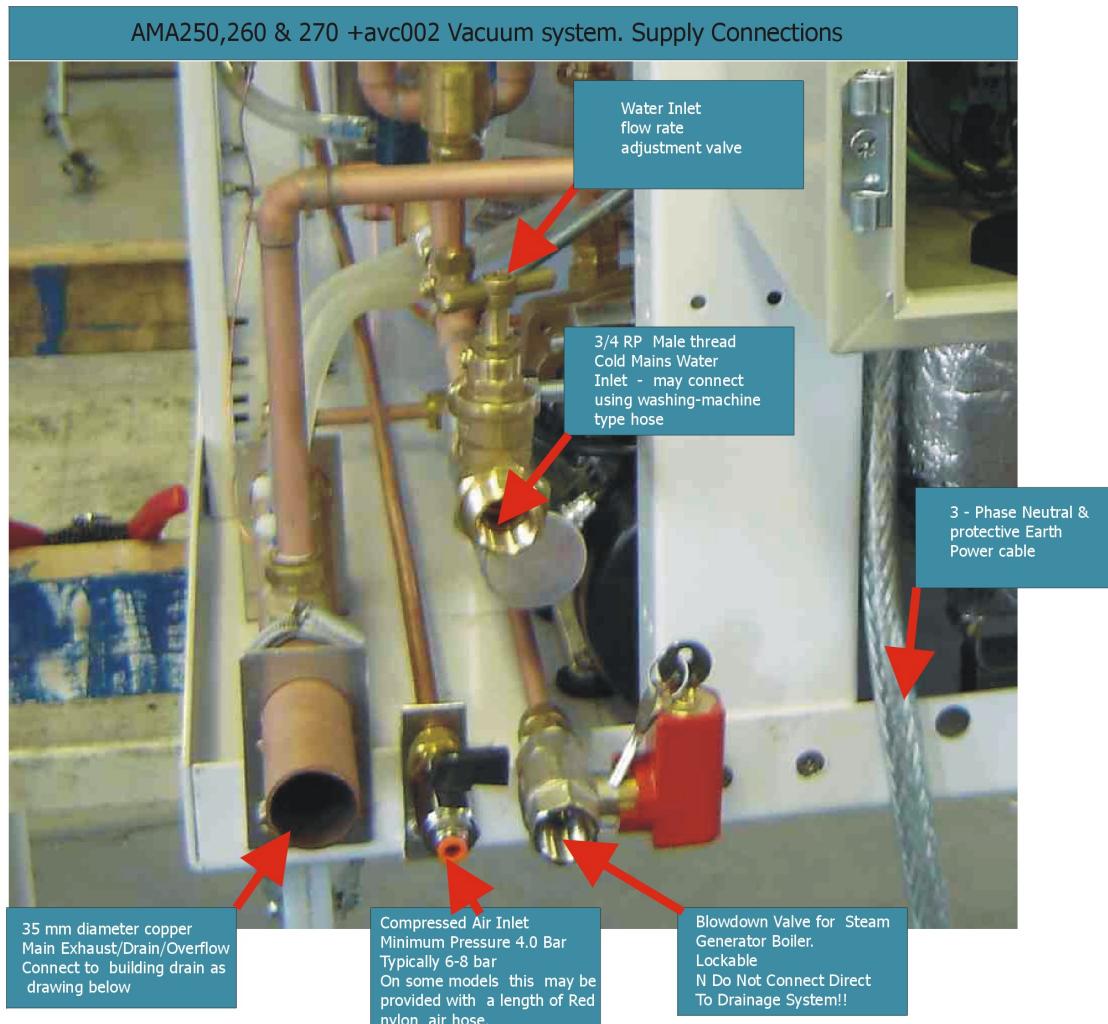
Example shows Direct Steam Heated Topload Model

Drainage arrangement for Frontload versions is similar - with Driptray drain as shown below.



Please note that this photo is for illustrative purposes only.
Actual machines may differ in detail.

On some models the air inlet hose is already fitted and the RED hose is coiled up at the rear of the cabinet.



POWER SUPPLY

POWER SUPPLY INLET CABLE

Electrically heated models are Not supplied As Standard with a fitted Power Supply Cable but this may be supplied at the option of the manufacturer or as an optional extra if ordered separately.

This Machine Must be installed with a 3-phase 5-core mains supply cable ideally provided with a standard -type Industrial High-Current plug. The Cable should preferably be of the heavy-duty SY type, Double-Vinyl covered and protected by a woven metal braid.

The STERILIZER has been tested in the configuration in which it is delivered from the factory. Details of the Supply Voltage and the Current rating, etc are given on the Serial-Number - Rating Plate attached to the machine.

Cable Alteration

Should it be necessary to Fit or alter the supply cable to suit local regulations or arrangements , the new power supply cable should be arranged in flexible conduit or use similar suitably protected power cable rated to carry the Maximum Current per Phase as specified on the Rating plate. The connections are made to Terminals in the Power Input Box. The Cable should pass through the cutout provided in the lower edge of the Power Input Box, allowing the panel to be removed for access. Steam Heted models use a connection to a CEE22 power inlet connector.

VOLTAGE RATING PLATE

Before attempting an installation, consult the SERIAL NUMBER / RATING PLATE fitted to the machine which gives supply type and voltage requirements

Consult the SERIAL-No./ VOLTAGE RATING PLATE Sited at the rear of the machine, or on some models , near the front to one side. The STERILIZER is normally delivered with the supply arrangement to suit the voltage and supply specified at the time of ordering. Should the Power supply need to be altered, from 1 to 3-phase etc the drawings at the back of this manual show how the 1 or 3-phase supply is connected to the terminals in the power input box.

Several models are available, With different Heaters and Supply wiring. Check the Power Rating on the Rating Plate and refer to the details in this section

PLEASE NOTE ..

ALL Voltages are measured phase-to-phase.

SWITCHED FUSED SUPPLY ISOLATOR

The Power must be fed from an EXTERNAL SWITCHED FUSED ISOLATOR .

This must be sited within 1 Metre of the machine.

Wiring Drawings

Please see the drawings at the rear of this manual for Electrical Wiring & connection details.

RCCD /RCD RESIDUAL TRIPS & EARTH-LEAKAGE TRIPS

The type of heater used in this machine means that Operation from a RCCD residual or earth-leakage trip may cause tripping problems ., This may occur especially if the machine is not operated for some time and is due to moisture ingress to the Inconel-Sheathed heaters. If this happens connect to a non- protected supply and run for 5-10 cycles. Then revert to Protected supply. If the tripping then continues please consult the manufacturer.

Uk Regulations & PAT testing

Please note that this equipment does not count as PORTABLE in the definitions for Pat safety testing and as such it does NOT need to be Pat Tested. If Pat Testing is to be carried out this unit MUST be classified as Computer/IT equipment and the test regime for IT equipment must be implemented.

This machine must be wired with a protective earth.

Mains Lead Wire Colours

These machines are not fitted as standard with a mains inlet cable unless specified to order.

Connection Cable Sizes

CABLE SIZE minimum	TOTAL POWER kW @ / VOLTAGE
2.5 mm sq 14 awg	5kW Direct Steam Heated 200-220V 3 PHASE
2.5 mm sq 14 awg	5kW Direct Steam Heated 380-440V 3 PHASE
6 mm sq 10 awg	24 kW 380-440V 3 PHASE
10 mm sq 8 awg	24 kW 200-220V 3 PHASE

Connect	Harmonised colours
Earth	Green/Yellow
Phase1	Brown
Phase2	Black
Phase3	Grey
Neutral	Blue

Fuse or Contact-Breaker Ratings-

The Supply ratings of the Electrically Heated models are given on the RATING PLATE at the rear of the sterilizer. If You are unsure please contact ASTELL .

Power Supply Suppression

The Power Lead is not part of the machine as certificated for compliance with the EMC directive.

Inside the Power Input Box are parts essential to the EMC performance of the control system electronics which must not be modified or removed.

When installing, any wiring work must be carried out with care to avoid damaging or displacing these suppression components.

380/440 VOLT 3-PHASE SUPPLY

These machines use individual 230v heaters connected in STAR formation between the 3 Phases and (on some models) Neutral.

CONNECTIONS 380-440 Volt 3-Phase:

Power Supply is connected as shown in drawing at the back of this manual

The Three Phase Supply must be a balanced 3-phase type. 2-phase and single phase supplies must not be used.

The neutral line must not have a fuse or trip in the circuit.

Astell can provide special versions to order, for supplies which have no neutral supply. Under no circumstances must the EARTH be used in place of a "Neutral"

MODELS FOR 200/240 VOLT

3-PHASE SUPPLY

WARNING

**200-220V 3-Phase High Current Rating
(ie not 380-440V)**

Please note that the supply ratings for these models are approximately double the Advertised/Published current ratings of the 380/440 volt versions. Refer to the Electrical Rating Plate for actual currents.

The 200-220v3 ph Power Supply is connected as shown in drawing at the back of this manual

The Three Phase Supply must be a balanced 3-phase type. 2-phase and single phase supplies must not be used.

The neutral line must not have a fuse or trip in the circuit.

The internal electronics etc operate from 230 volts supplied by a step-up internal transformer between Phase 1 and Neutral. 3-Phase Motors In Pumps, Vacuum pump, etc are dual voltage, wired in delta formation for 200-220v. Where Single-phase 230V motors are used these are operated between two phases with fuses/trips in each supply.

200-220v 3-PHASE SUPPLIES WITHOUT NEUTRAL

This is option requires no Neutral supply. Connect as described above but omit the Neutral connection.

The internal electronics uses a 220V supply derived from two Phases @ 200-220v via an internal Isolating Transformer.

DIRECT STEAM HEATED MODELS

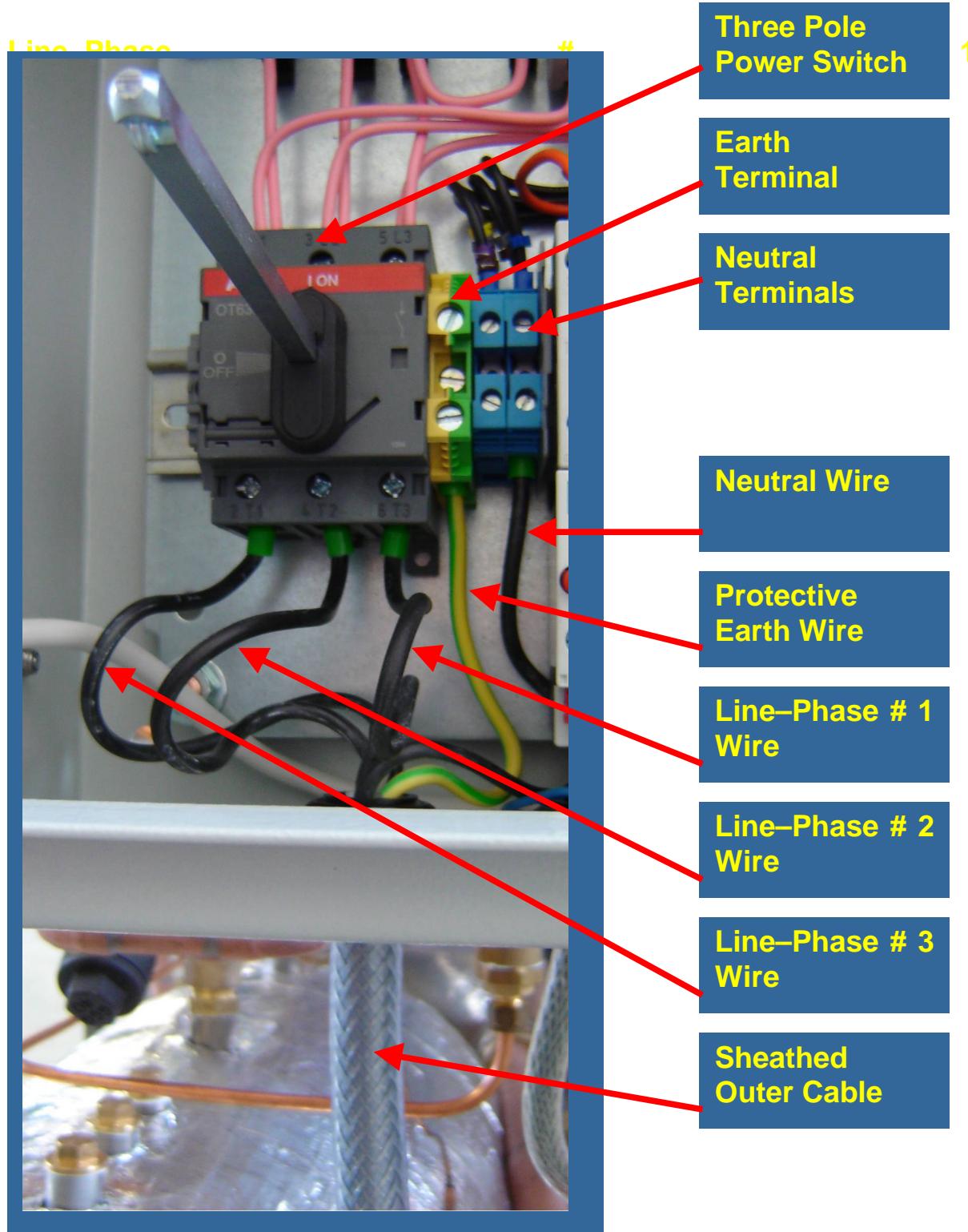
Direct-Steam Heated Machines Power Input wiring arrangements are the same as Electrically heated models but with a lower operating current

No power is needed for the heaters. The power operates just Pumps, Motors, & control system.

Motor Rotation

The Phases must be connected in the correct order to ensure the pumps etc run in the correct direction. If in doubt check function of the Vacuum pump and reverse any two of the three phases if it fails to draw a vacuum.

**Connect 3 Phase Power cable as shown in this Photo-Diagram
(3 Phase Lines, Neutral and Protective Ground)**



OPERATING INSTRUCTIONS

The following Sections provide Operating instructions in both a fully detailed version and Short-form which can be copied and fixed to the wall near to the Sterilizer .

Full details of the **Cycle Entry Procedure** and further technical details are provided in a separate **PROGRAMMING & CONTROL SYSTEM MANUAL** part no **MXN782**

Other options such as the RS232 Communications option are detailed in separate instruction manuals.

INFORMATION ON APPROVED USE

This equipment is not designed for use other than as a medical / laboratory / general steam sterilizer for use within the temperature and pressure ratings of the chamber design.

Any alternative use or method of operation not covered and specified within this and associated instruction manuals is specifically excluded and may be hazardous. The manufacturer does not approve such alternative use and under no circumstances will the manufacturer or his agents accept responsibility for loss, damage, or injury, consequential or otherwise, as a result of such alternative use.

The manufacturer reserves the right ,in certain cases, to reassess &/or amend the design or specification, and provide individual written instructions detailing an alternative use that is considered acceptable.

This Sterilizer Is designed and intended for a very wide range of loads and process cycles. It is not possible in this manual to encompass every possible cycle or load requirement that may be encountered.

General principles are provided , with a selection of examples and explanations. It is to be expected that a certain amount of experimentation may be required before the most suitable process cycle or method of loading can be arrived at.

Astell Scientific and approved agents are able to offer advice and assistance in setting up and commissioning this sterilizer. Please consult Astell Scientific or your supplier if necessary

SECURITY PASSWORDS

The System protects from unauthorised use by security Password codes

The Factory Set numbers are –

Operator	111111
Supervisor	222222
Site Engineer	333333
Astell Engineer	444444-

If in doubt Consult Your Supplier

SWIFTLOCK "Secure-Touch+ " AUTOFILL STERILIZER

QUICK REFERENCE OPERATION GUIDE

Cycles Without Load Sensing Timing

1. Check that display Power is On
2. If display shows "Tank water level low", add water to Tank
3. Press "Door" Button.
The bolt will unlock . 
4. Turn Handle, & open door.
5. Check Gasket is correctly seated and inspect for damage.
- 6 LOAD STERILIZER.
7. CLOSE Cover and rotate handle to lock.
- 8 Select Cycle
9. Press [START] Button.
Cycle will begin.
10. When Display Shows "COMPLETE" at end of cycle,

press [DOOR]



- 11 Door unlocks
rotate handle & Open door.

AFTER USE

After unloading Sterilizer always leave Cover slightly open when not in use to avoid compressing gasket.

Do not add water when cycle is running.

CLEANING

Clean chamber and wash out the tank regularly, as water contaminated with spilt load contents will cause failure and may burn out heaters or block pipework, valves or drains.

SWIFTLOCK "Secure-Touch+ " AUTOFILL STERILIZER

QUICK REFERENCE OPERATION GUIDE Cycles With Load Sensing Timing

1. Check that display Power is On
2. If display shows "Tank water level low", add water to Tank
3. Press "Door" Button.
The bolt will unlock . 
4. Turn Handle, & open door.
5. Check Gasket is correctly seated and inspect for damage.
6. LOAD STERILIZER.
If the Cycle requires use of LOAD SENSING Place Load Sensing Probe in position in centre of load
If cycle does NOT require use of the Load Sensing probe, place the probe safely to one side of the load .
7. CLOSE Cover & rotate handle to lock.
- 8 Select Cycle
9. Press [START] Button.
Cycle will begin.
10. When Display Shows "COMPLETE" at end of cycle,

press [DOOR]



- 11 Door unlocks
rotate handle & Open door.

AFTER USE

After unloading Sterilizer always leave Cover slightly open when not in use to avoid compressing gasket.
Do not add water when cycle is running.

CLEANING

Clean chamber and wash out the tank regularly, as water contaminated with spilt load contents will cause failure and may burn out heaters or block pipework, valves or drains.

12 Open door fully & unload chamber.

13 If [DOOR] button is pressed and Door is not opened it will cancel after 10 seconds, and will re-lock. After this , to OPEN , just press [DOOR] button again .

Notes-

If Door is closed by accident, press [Door] key To Open .

If handle is rotated to LOCKED position with door open , press [DOOR] button and return handle to "unlocked" position.

TOUCHSCREEN CONTROL SYSTEM TECHNICAL SYSTEM OVERVIEW

The **SecureTouch Colour+** controller provides an LCD full colour display with an LED backlight system.

The Front of the display is covered by a Glass touchscreen which is sensitive to the touch of a finger or blunt stylus.

The system is able to detect the position on the screen that has been touched and can interpret this as if it was a "Button-Press".

The controller system is arranged to show a number of different screen layouts of information , together with the required "Buttons" -(shown on the screen as rectangles with bevelled corners) When a screen shows a button , then a press on the button will select that item.

SCREEN CONTRAST

The Screen contrast is adjustable

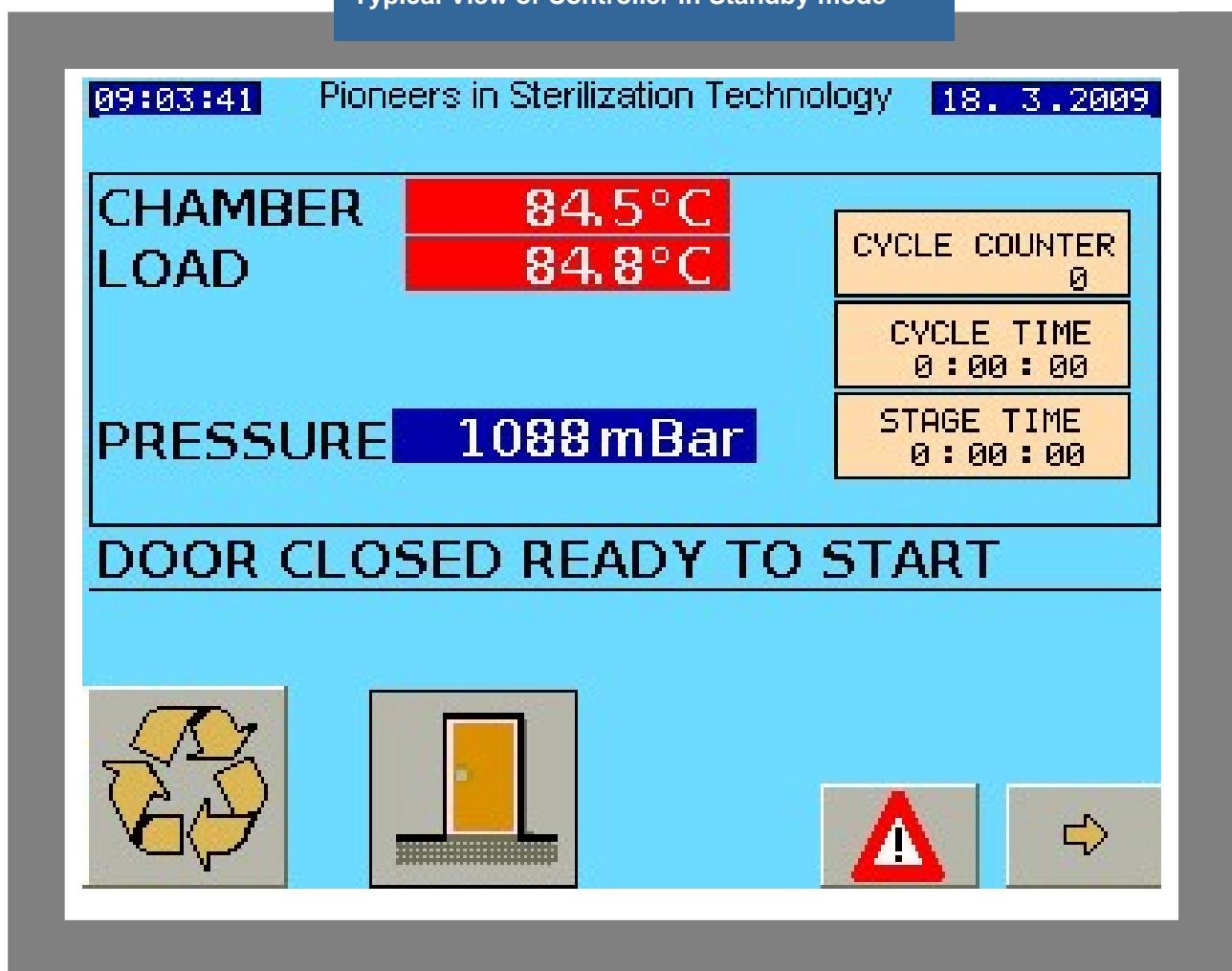
There is a +/- contrast adjustment available in the **Main Menu** screen System info (See Programming manual)

If the screen has lines or is smudged please advise your Service Engineer.

DISPLAY SCREEN DAMAGE

As with Computer screens generally, this screen is made of thin glass layers. These are easily damaged if they are impacted by a heavy object or excess pressure is applied to the glass. In this case the glass will crack and the display will have to be replaced. Note that this will not normally be covered within the warranty.

Typical View of Controller in Standby mode



SYSTEM CONTROLS

INSTRUMENTATION

Power Isolator Switch

Turns on AC Mains Power to the system
This is fitted inside the Power Inlet Compartment ,
for service isolation only.

Emergency Stop Switch

On Front panel
This is a KEYRESET Emergency Stop Switch

***Press in to TURN OFF,
Turn Key to Release & TURN ON***

Cool Lock Thermostat(s)

There may be up to 3 of these and they are sited
behind the cabinet panelwork.
These sense chamber temperature & are used to
restrict opening with hot fluids.
See "safety interlocks" section

Water Tank Thermostat

This controls the water temperature in the tank and
adds cool water flow if it rises above the temperature
setting. NOTE this is normally set to 26C or below. If
the water temp is above this the water flow will be
continuously ON.(See further in manual for setting.)

Internal Steam Generator models only

Boiler Overtemperature Thermostat .

Sited inside the cabinet adjacent to the Steam
Generator Heaters.

This takes over control of the heater in the event of
water loss or overheating. It resets automatically
when the temperature falls.

Boiler Pressure Switch

Sited inside the cabinet adjacent to the Steam
Generator Heaters. This controls the operating
pressure of the Steam generator Boiler in normal
use by turning the heaters on and off at the set point
pressure.

The function of conventional "Instruments" is taken
by computer sensors and displays shown on the
LCD display. These readouts are only displayed
when necessary in the cycle.

CHAMBER Temperature Readout

At top - left of display during running Cycles.
(Accuracy better than +/- 1.0 Deg C)

LOAD SENSED Temperature Readout

Alternates with Time on display during running
Cycles. (Accuracy better than +/- 1.0 Deg C)

PRESSURE Readout Display

At top - right of display during running Cycles.
(Accuracy Better than +/- 0.04 Bar)

PRESSURE Gauge CHAMBER Dial Bourdon
pressure gauge at front of machine. (Accuracy
Better than +/- 5%)

PRESSURE Gauge STEAM GENERATOR Dial
Bourdon pressure gauge at front of machine.
(Accuracy Better than +/- 5%)

PRESSURE Gauge JACKET Dial Bourdon
pressure gauge at front of machine. (Accuracy
Better than +/- 5%)

TIMING

Various timing functions are displayed on the screen
in Mins:Secs

INSTRUMENTATION CHECK

In Standby/Ready state - with door shut- the system
displays the current measured variables.

FAULTS

Should there be an instrumentation problem a
monitor system detects out-of-range values and
reports them via the FAULT system

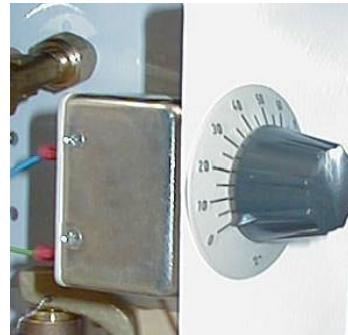
SAFETY INTERLOCKS

PRESSURE INTERLOCK

Preset to [less than +0.15 Bar] this is an independent electrical interlock operated by a precision pressure switch preventing the electrical release of the Closure lock if the chamber is pressurised.

OVERPRESSURE CUTOFF

This is preset to approx 3.00 BarG/4.00 BarAbs .(Above the safety valve point,) & operated by the electronics control software. If the pressure sensed by the controller pressure transducer exceeds this level , which suggests safety valve problems, then the heating is shut down, a warning shown and a fault condition generated.



Typical View of Cooling Lock Thermostat

NOTE;-The temperatures will not be quite the same, due to differing thermal inertia.between the Chamber Wall and the Load. Normally the Chamber wall & Cooling Lock sensor attached to it will cool down faster than the load.

TEMPERATURE INTERLOCKS

COOLING LOCKS

There are two or 3 Cooling Locks to prevent the Sterilizer being opened with a Liquid Load under unsafe conditions.

There are two cooling lock systems ;-They remain electrically LOCKED until the load has cooled to a safe handling temperature COOLING LOCKS operate for FLUIDS and DESTRUCT Cycles .

WARNING- THE COOLING LOCKS CAN PRESENT A HAZARD IF INCORRECTLY SET.

They should be adjusted by the supervisor, or a person trained in Sterilizer use & the setting of safe sterilizer cycles.

PRESET COOLING LOCK THERMOSTAT (S)

A thermostat with Dial & scale calibrated in Deg. ,0-100C, behind the cabinet side cover panel or at the rear.

It measures temperature of the Chamber outer Wall, with sufficient thermal mass for a reasonable match between the Load Temperature and the Cooling Lock Set temperature , .

CYCLE COOLING LOCK.

The STANDARD SYSTEM Operates when LOAD SENSING option is NOT fitted or NOT selected.

This uses a Cooling-Lock-Temperature set by the user within each Cycle Profile which is compared with the Chamber Internal Temperature Sensor reading (the same temperature as appears on the Temperature display). When the CHAMBER temperature is above this "CYCLE" cool-lock temperature the lock is active (engaged) and Completion is inhibited preventing the door from unlocking..

NOTE;- The Chamber-Sensor detects the temperature within the steam space & it will normally Cool faster than the Load &/or the chamber Wall.

Load Sensed Cooling Lock

(if LOAD SENSED COOLING OPTION is fitted & selected for that Cycle)

In this case the Cooling Lock Temperature set for the Cycle is **not** compared with the Chamber Temperature but instead **the Temperature measured by the flexible LOAD sensor**. When this Load-sensed temperature is falling but still above the "CYCLE" cool-lock temperature the lock is active (engaged) and Completion is inhibited , so the door cannot be unlocked.

AS the LOAD SENSING PROBE detects the temperature within the LOAD itself , it will always represent the actual load temperature., assuming it has been correctly placed in the load.

COVER CLOSURE SYSTEM INTERLOCKS.

The cover is prevented from being opened by a Pneumatically driven locking bolt pin. This Locking Bolt pin engagement and Cover Position are sensed by high-reliability Micro-switches. The system cannot be started unless the closure is fully secured and locked.

Swiftlock Rotary Closure

The Closure interlock system senses the position of the rotating ring which has the interlocking "Dogs". The Ring is held in the LOCKED position by a a Pneumatically driven BOLT that extends into a hole in a block on the ring periphery, preventing the rotation of the ring and prevents the handle being moved.. The system also detects the "engaged" position of the locking Bolt

The Cover can not be opened if:-

1 Chamber Temperature is above selected Cooling Lock setting (liquid/fluid Cycles only), and Pressure is above approx. 1.5 p.s.i. /0.2 Bar.(for all Cycles)

2 (The Programmable Cooling Lock Temperature is set within each Cycle. But the PRESET cool lock temperature is a single setting applying to all Cycles.)

The Cover is also Locked if POWER is OFF.

3 After pressing the [DOOR OPEN] button the locking pin retracts ,

4 The Cover can only be opened by pressing the [DOOR]

NOTE- The [DOOR OPEN] button will NOT open the Cover if it is prevented by the Cooling Locks or the pressure interlock .

5 The system will only start and run cycles if the Cover is fully CLOSED & LOCKED.

It is not possible to pressurize the chamber with the Cover Unlocked.

HEATING SYSTEM:

All models are heated by Steam . –"Direct-Steam Heated" Models require an external source and "Internal Steam Generator" models have a boiler within the panel work that produces the steam. Steam is admitted to the chamber from the supply, controlled by a Pneumatic actuated valve.

TEMPERATURE CONTROL SYSTEM

A Temperature Control

The Chamber Temperature Is measured by a PT100 precision sensor. This is compared with the Sterilize Temperature - the "SETPOINT" stored in the Cycle Profile, and the controller acts to keep the chamber at or about that temperature by switching the heat source. Control of temperature does not rely on steam pressure.

The actual temperature that the control system tries to attain for will be varied automatically at different parts of the cycle . This does not require user attention during the cycle .

A Pressure Control Version

The Chamber Pressure Is measured by a precision precision sensor. This is compared with the Sterilize PRESSURE- the stored in the Cycle Profile, and the controller acts to keep the chamber at or about that Pressure by switching the Steam source. Control of temperature is achieved since the Temperature inherently linked to the steam pressure.

STERILIZE TIMING SYSTEMS :

a] Standard Timing System;-

This operates if LOAD SENSED TIMING option is not fitted, or if fitted but it is not selected

Sterilise Timing starts when chamber reaches set temperature, and terminates at end of set period.

b] Load Sensed Timing System;- (Optional Extra)

LOAD SENSED TIMING is selectable (on or off) within each of the Cycles.

Sterilise Timing starts when the LOAD SENSOR reaches set temperature, and terminates at end of set period.

Please see LOAD SENSED TIMING section

COOLING (Water Cooled Models)

Cooling action operates whenever appropriate in the Cycle and only works for Cycle types that do not permit DRYING, eg Fluids cycles At the end of Sterilize for Liquid /Fluid Cycles , initially convection *ambient* cooling cools the chamber to a preset threshold . When this temperature is reached

The cold water from the Tank is circulated through the Full or Partial jacket on the chamber. When the cooling lock release point is attained the water is discharged .

OPERATION

FILLING WITH WATER

This machine takes water in from the water inlet supply - Untreated tap water or Softened water can be used

The machine is fitted with a FLOAT-BASED Water detection system

Demineralised ✓ Distilled water ✓
Tap-water ✓ Softened water ✓

LOW WATER INDICATION

If the **TANK WATER LEVEL** is low the display shows ;-

TANK WATER LEVEL LOW

This means that the internal water tank is low on water .

This suggests that the water inlet supply is turned off, or not connected. Please see installation pages for details of water supply inlet.

In normal operation the Tank is maintained full of water automatically and this message is not shown.

CYCLE DETAILS & DISPLAYS

Each cycle has a set of pre-defined settings and the cycle stages are selected to suit the load.

Different Cycle Types have different combinations of stages.

The Sie Engineer / Supervisor security level and above is given access to parameters which are adjustable to suit the size and nature of the load.

FEATURES OF THE CYCLE STAGES

- PREVACUUM Pre-Vacuum. A vacuum is sucked inside the chamber to a preset level, eg 200mBarAbs.
- VACUUM PULSING NEGATIVE The chamber is hot but at a pressure less than ambient. A preset pressure (eg 800 mBar Abs) is attained & vacuum is drawn inside the chamber to a preset level, eg 300mBarAbs.
- VACUUM PULSING POSITIVE The chamber is hot & above ambient pressure . A preset pressure (eg 1800 mBar Abs) is attained & vacuum is sucked inside the chamber to a preset level, (eg 1050mBarAbs.)
- HEATING TO STERILIZE The chamber heats until the Sterilize Threshold is attained.-either the chamber or the load reaches set temperature. see Load Sensing...
- STERILIZING The Sterilizing Time is started automatically under program control when the system attains the set Temperature.or- see Load Sensing...
- STABILIZATION a short delay to allow the system to stabilise before Sterilizing continues
- LOAD SENSED TIMING If Load Sensed Process Timing is fitted and set up correctly then the system will ensure that the load heats to process temperature as quickly as possible and is processed at the set temperature.
- DRYING For types of Loads that require DRYING a vacuum is applied for a preset time inside the chamber to a preset pressure level, typically below 100mBarAbs. Drying Time is adjustable.
- COOLING. For Fluid Loads (not using drying) Cold Water is circulated through the Chamber Jacket to cool the load down as fast as possible.

- AIR BALLAST COOLING (Option on some models) For Bottled-Fluid Loads Air-Ballasted Assisted Cooling is provided to allow use of Sealed Bottles & minimise liquid loss.

Pressure is maintained with air above the set pressure point as cooling progresses. The air may be internally generated or externally supplied

- AIR WASH Air is passed into the chamber over the load to remove steam when the door is opened.
- Air Break Air is admitted to the chamber to release the vacuum . This air will usually be passed through a bacteriological filter if this option is fitted.
- Cycle Complete Chamber is cooled to a point where it is safe to open. Open Door & Load may be removed.

Please note that correct Sterilization is dependent upon the Cycle being suitable for the load and type of processing required.

STERILIZATION CYCLES NOTES & ADVICE

This information is in addition to the section
STERILIZATION CYCLES NOTES & ADVICE
given in The Programming Manual

INSTRUMENT & GLASS CYCLES

Specific cycles for Instruments and Glass are not available on CLASSIC models

You may sterilize these loads however they will come out WET.

There is no drying system available.

FLUIDS OR LIQUID CYCLE

This is suitable for processing Media or other fluids etc in UNSEALED containers.

FLUID WASTE DESTRUCT Cycle

This is suitable for processing laboratory waste;- petri dishes, tubes, jars, bottles etc. These must be in a shallow open container and not sealed in a plastic bag.

SELECTING AN AIRPURGE TIME

Suggested Airpurge - settings

FLUIDS IN UNSEALED CONTAINERS ;-
Set the Airpurge period between 3 & 15 minutes* *

FLUIDS WASTE DESTRUCT ;-
Set the Airpurge period to 7 - 20minutes * *

* * AIRPURGE TIMES

Airpurge times longer than 15 minutes on an **unloaded or lightly loaded chamber** may cause problems with boiling Dry . Long times are usually only necessary with full loads.

"Open" load containers without drain holes which can collect and trap condensate from draining back down to the chamber base – can retain water causing boiling dry .

Long Airpurge times can mean excessive heating in the condensate bottle and potential hazards from steam and condensation.

Please ensure that the load and containers match the selected cycle.

LOADING & PLASTIC BAGS

Note that the worst loads for air removal are Loads in Plastic bags , Loads with lots of small spaces like PETRI dishes, small bottles etc. These will always need a longer Airpurge period.

Best performance is obtained when Plastic bags are not used.

if it is in a plastic bag this should not be sealed and the top must be opened up completely and ideally rolled down so that the maximum area of the load is exposed to the steam without the top of the bag getting in the way. The container holding the bag must have large holes in the sides to allow steam to enter the container sides and the Plastic bag must be slashed or cut with a knife through these holes so that the steam can get into the bag.

A variety of different special containers are available from ASTELL that contain the load and allow thorough air/steam passage, whilst maintaining integrity and facilitating pouring away liquid residue. Please consult your supplier.

SELECTING STERILIZE TEMPERATURE SELECTING STERILIZE TIME

The U.K. Medical Research Council recommended the following time/temperature relationships for the achievement of sterilizing conditions:-

Minimum Sterilize Temperature	Maximum Sterilize Temperature	Minimum Sterilize Hold Time
134	138	3 min
126	129	10 min
121	124	15 min
115	118	30 min

Lower temperatures or shorter times may have to be used to prevent degradation of bacterial growth media. This may be adequate for culture purposes , but does not constitute full sterilization. The manufacturer of the media will usually specify the sterilizing temperature.

Temperature Tolerance

Please note that during sterilizing the temperature will normally cycle up and down over a range of approx +/- 0.7C around the set sterilize temperature. Where temperature is specified as "-0 +??" adjust the temperature as shown here.

Specified Settings	Recommended Cycle Settings
134C -0+4 3 mins	135C or 136C ; 3 mins
126C -0+3 10 mins	128C 10 mins
121C -0+3 15 mins	123C or 122C 15 mins
115C-0+3 30 mins	116C 30 mins

LOAD SENSED TIMING

Option- see Load Sensed Timing

Sterilise Time :

Set the Sterilise Time to the desired "exposure time". At the sterilise temp.

Allowance For Extra Sterilise Time For Load To Reach Sterilise Temp

Fluids Loads normally require an allowance for extra time for heat-up as they suffer from high thermal inertia .If the LOAD SENSED TIMING option is not used an allowance is needed for the time taken for the load to catch up with the chamber temperature. Extra time should be added to the Sterilise time to compensate.

Sterilise Temperature;

Set to the desired Sterilise Temperature .

Stabilise Time

Set to between 1 and 5 minutes

COOLING

The COOL parameter Must be set to COOL1

COOLING LOCK(S)

These will need to be set up for optimum operation however as a Starting Point ;-

Set Cooling Lock Thermostat to
80C for safety.-

Set Cycle Cooling Lock temperature to 80C

Please see SETTING UP AND
COMMISSIONING SECTION for more info.

COOLING LOCK SETTING

During cooling inside the chamber, the load cools slower than the chamber temperature and gives up heat to the chamber walls. This means that the chamber will reach 80C before the load so (unless load sensed timing is fitted + on) the cooling lock setting will need to be BELOW the temperature

It is possible to set the cooling locks by trial and error but they are ideally set using a thermocouple (t/c) and digital thermometer with the t/c sealed inside the chamber immersed in the liquid load. This is quicker and more accurate but is normally carried out by a service or commissioning engineer requiring use of a Thermocouple entry adaptor, and details are in the Service Manual.

SETTING CYCLE WITH LOADSENSE TIMING OPTION .

The Load Sensed Timing system detects the Load temperature , and automatically allows for the time-lag caused by the load delay in reaching sterilise temperature.

Set up the system as described above for the system Without Load Sensing, but with the following detail changes .

In STERILISE Stage Cycle Settings:-

- a) Set the STERILISE TIME to the Actual STERILISE TIME.(no extra allowance heat up)
- b) Set the LOAD TEMPERATURE to about 1-2 C below the sterilise temperature

When the load reaches set Load Temperature the Stabilise time will begin , followed by the Sterilizing Timer starting , and the cycle will proceed

MEDIA HOLDWARM

If Media Holdwarm is required at the end of the cycle, then 'HOLDWARM' should be set to ON in the COOL stage CYCLE SETTINGS

The Holdwarm system is designed to allow sterilisation of MEDIA loads ,with a holding stage during the cooling process that maintains the temperature of the load and chamber warm enough to permit pouring of the melted media. The media will be kept warm for up to 48 Hrs . The Autoclave may be set to operate overnight with a Media Load, in the knowledge that it will contain a useable load when opened in the morning.... or later in the day

"Holdwarm" takes place between COOLING and COMPLETE

When the Complete Conditions are met as described above, if selected, the system goes instead to the HOLDWARM stage

TO ENABLE HOLDWARM

In each FLUIDS PROGRAM where Holdwarm is required, , set Holdwarrm to ON/Yes and set the required Holdwarm temperature.

**Note – do not confuse HOLDWARM with MEDIA WARMING PROGRAMS.
MEDIA WARMING is specifically to heatup cold media without sterilizing.**

PRESSURE SWITCH INTERLOCK

Should the Fault system indicate a Pressure switch fault This usually indicates a bad adjustment or Drift in the Pressure Switch .

The Pressure switch should release at approx + 0.15 Bar Gauge. Due to age or stress this setting may drift.

The system monitors this switch as a safety feature to prevent opening the chamber if the pressure exceeds 0.15Bar.

Observe the Pressure and Temperature displays.

If
A the Pressure displayed is close to Atmospheric pressure (eg around 0Bar)

And

B the temperature is near to room temperature
And

The door cannot be opened.

, then ;-
the Pressure switch may be out of adjustment.

It may resolve itself if left for 1-2 hrs to cool down .

If this continues, the Pressure switch should be checked and adjusted - please contact your service agent Or Astell Scientific for advice.

Typical view of Pressure Switch



LOAD SENSED TIMING (Optional extra)

All Sterilizer loads have Thermal Mass. This means that the load will ALWAYS heat up more slowly than the Sterilizer chamber. If this is not allowed for in timing of the sterilize Cycle profile, the load will not be subject to correct sterilizing conditions, ie it will be exposed to the set temperature for too short a time. Load Sensed Timing avoids this problem.

Load Sensed Timing is selected in the CYCLE SETTINGS – Sterilise Stage by setting which Sensor is used to initiate the Sterilise Time , setting a Load Threshold Temperature.

If set to an appropriate temperature-(such as 121C) then the LOAD SENSED TIMING is ON

If this is set to 0 C then the LOAD SENSED TIMING is OFF

Please see the Programming manual for full details

IMPORTANT

The position of the Load sensing Probe is very important. The probe must be in the same place for running cycles as it was when the Cycle was commissioned.- so you will need to set up a laboratory procedure to ensure it is always placed correctly.

If correctly positioned the LOAD SENSING PROBE detects the temperature within the LOAD and so will ensure that the load experiences the set conditions for the set time,

If it is just put to one side of the chamber instead of in the load then Fluid Loads will experience only a very short time at Sterilise temperature or may not reach Sterilising at all.

COOLING LOCKS AND LOAD SENSED TIMING

Selection of the LOAD SENSED TIMING function in a LIQUID or WASTE DESTRUCT Cycle also implements a LOAD SENSED COOLING LOCK for that cycle . In this case the COOLING LOCK senses and acts upon the actual Load temperature

The Cooling Stages operate normally but the "COMPLETE" stage cannot be reached until the load , and hence the LOAD SENSING PROBE has cooled to a temperature below the COOLING LOCK TEMPERATURE set for that Cycle.

Set the Cycle COOLING LOCK TEMPERATURE to the actual Temperature of the LOAD at which the Cooling Lock is to RELEASE and allow the door to be opened. It is advisable to err on the Cooler side , for safety.

SPECIAL LOAD SENSORS

The Load sensor provided with this system is a 5mm/6mm Dia flexible type. This may be too stiff or solid to use for some loads.

Alternative probes May be available. Please consult Service dept. or your dealer

OPTIONAL PRINTERS

PRINTER INDEPENDANCE

Please note that the fitted printer is not independent & has no separate sensors or intelligence – it records from the control sensors and prints the same data as available on the display..

If your QA requirements dictate that the printer gives a totally independent readout and record of measurements Please consult your Agent or Astell Scientific. A range of independent printing solutions are available that work together with these models.

Three types of Printer are available

A INTERNAL STANDARD PRINTER OPTION

Please see instructions below

B EXTERNAL STANDARD PRINTER OPTION

Please see separate manual for external printer option

C EXTERNAL User-supplied Rs232

Please see separate manual for RS232 Communications option

INTERNAL PRINTER OPTION

The standard printer supplied is the Astell Type MPP537X. This is a 40 character dot-matrix impact printer which prints on 58mm wide plain roll paper. It uses a replaceable ink ribbon cartridge and prints in one single colour (Black)

Topload Models

The printer is mounted in the Front face of the machine.

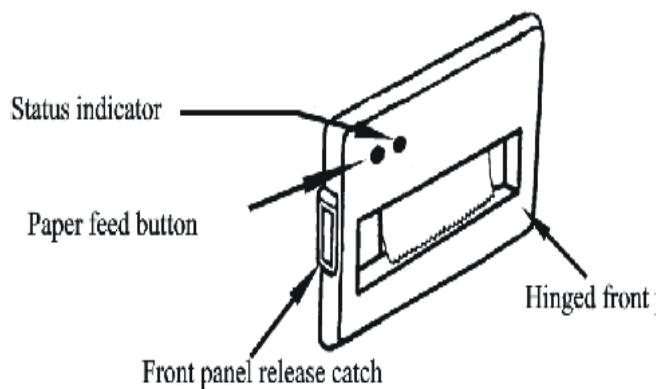
Frontload Models 60L and below

The printer is mounted in the top cover

Frontload Models 80L and above

The printer is mounted on the Front face of the machine.

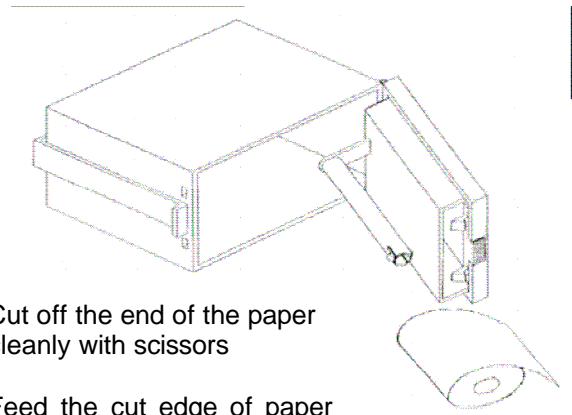
MPP537X Printer Models



Installing Replacement paper

Open the front panel, remove the paper centre roll tube of the old Paper Roll.

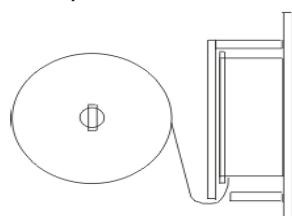
Slide the new Roll over the Paper Roll support until it is held by the clips



Cut off the end of the paper cleanly with scissors

Feed the cut edge of paper up into the printer mechanism and operate the PAPER FEED button.

Paper Roll Path



For best operation use only Astell Scientific Supplied paper and ribbons.

Incorrect loading causes many expensive service call-outs. Please ensure that the paper loading method described here is used . Do not tear-always cut the paper with a sharp pair of scissors- a likely cause of problems is the introduction of paper fragments produced when paper is torn.

CHANGING PRINTER RIBBON

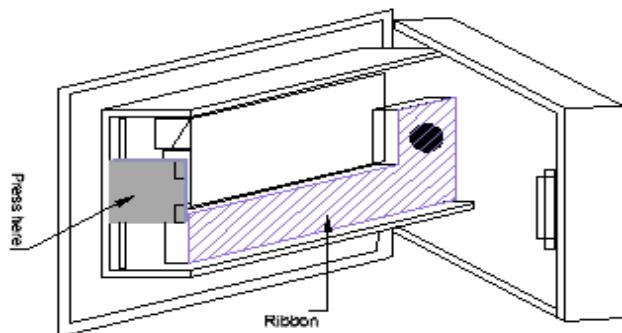
First remove paper from the printer.

Open the Printer Front panel.

Press in on the Plastic Tab shown in the view below . This releases the two halves of the front panel so that the front cover can swing away from the printer itself.

The Printer Ribbon is the small black L-shaped cassette that sits below the paper inlet slot.

Grasp at both ends and pull firmly away from the printer assy.



To fit the new ribbon

Hold the new Ribbon Cassette by the ends and rotate the small wheel using the tip of a Biro Pen in the direction shown by the arrow on the cassette. This tensions the ribbon.

Place the New Ribbon Cassette in position on the mechanism. Press the Larger end with the Wheel down gently until the clutch engages then press the other end down until seated correctly.

Press "PAPER FEED " for 5-10 seconds to align the ribbon in the slot. The ribbon should run neatly in the slot provided. If the ribbon is distorted and above the slot, remove & re-tension the ribbon and repeat the fitting.

Re-load the paper as described above.

OPERATION OF PRINTER

Please note that the print is not visible immediately after printing since the point at which the printing occurs is a few mm inside the case & hence may be out of view.

Printing is automatic whenever it is required by the Cycle .

Cycle Progress is printed automatically as the cycle runs.

All relevant events are printed such as;-

Start information, Cycle selected, Cycle details,

Temperatures pressures & Times etc

Cycle No

Stage Changes

Manual Stage Changes or operator intervention

Faults if & when they occur

Completion details and Time etc

PRINTER PAPER-FEED

To advance the paper ;-

Press the "PAPER FEED" button provided on the printer.

This is also useful to check that the paper is feeding properly.

PAPER TEAR-OFF

Press the "PAPER-FEED" Key to move the paper end up .

Hold the end of the paper firmly and pull gently at right-angles towards the toothed edge of the paper slot with the sharp teeth, to tear the paper Do not pull the paper straight out of the printer .

Printer PROBLEMS

Most Printer Faults are due to the paper or ribbon being incorrectly installed or use of incorrect paper or ribbons.

PRINTING VERY FEINT

Replace Printer Ribbon

CENTRE OF PRINT BLURRED OR MISSING

Ribbon incorrectly installed with ribbon out of slot in centre

PAPER WILL NOT LOAD

The Paper end MUST be cut cleanly at the end or it may tear , jam, and clog the printer mechanism
Ensure paper roll is fitted correct way up.

RIBBON

Ribbons must be fitted with the ribbon correctly seated in the slot.
If the printing becomes faint replace ribbon.

Oversize Paper

use only Astell-supplied or Astell- approved paper.
Alternatives may appear similar but poor paper quality can damage printer or use up ink on ribbon too quickly.

Paper rolls purchased for Adding Machines and Tills are not suitable and are usually too large. They also tend to shed paper fragments into the mechanism and cause premature failures.

WARRANTY

Installation of paper to the printer is outside the manufacturers control. Service calls during the warranty period which (in view of the manufacturer or agent) are caused by the incorrect type, use or fitting of paper or ribbon , may incur service charges.

PRINTER SPARE PARTS**Paper**

(Per 58 mm Roll)

Astell Part No SXP374

Ribbon cartridge

Astell Part No SXP373

EXTERNAL PRINTER OPTIONS

See ADDITIONAL MANUALS provided for particular option.

MAINTAINANCE AND CLEANING

STERILISER CLEANING

WATER QUALITY AND CLEANLINESS OF THE CHAMBER ARE VITAL TO THE CORRECT OPERATION OF THE SYSTEM .

This Sterilizer is designed to Heat clean Water in the steam generator The water in the tank may become contaminated by unsterile condensate or drainage from the Chamber.If the tank water becomes contaminated with AGAR, BLOOD, FAECES , or solid rubbish it will cause fumes, smells, potential health problems and accelerated machine failure.

The Chamber and all wetted parts should be Cleaned regularly in order to maintain adequate operating conditions. Load Containers should be chosen to minimise loss of the contents into the Sterilizer, e.g.: do not use plastic bags inside Sterilizer Baskets but use a purpose-made Sterilizer container designed to catch leaking waste. Please ask your supplier for details of containers for your machine.

CHAMBER

The Chamber should be cleaned internally to prevent build-up of contaminants , and we would suggest that for a machine in daily use, if used for Fluid Loads or WASTE DESTRUCT the Chamber should be checked once a week and cleaned if necessary, . For other applications Cleaning should be at monthly intervals or more frequently.

TANK

The Tank should be checked and cleaned if necessary at each recommended 6 month service.

CABINET AND GENERAL CLEANING

The cabinet painted surfaces may be cleaned with a damp cloth moistened with a drop of household detergent.

Do NOT use Abrasives or Chlorine-based cleaners or bleaches on the cabinet or chamber

Cleaning of LABELS & WORKING PARTS Clean Labelling, aluminium parts or working parts with a soft cloth moistened with a little methylated spirits. Do not use Solvents IPA, or Aqueous Cleaners which may remove the printing or melt the plastics.

Cleaning of LCD TOUCHSCREEN ;- Clean with a purpose designed impregnated cleaning tissue or if this is not available a soft cloth dampened with a

little water. Alternatively you can use Spectacle Cleaning Wipes" suitable for Plastic lenses.

If stubborn marks persist use a soft cloth moistened with a very small amount of methylated spirits. Do not use IPA or similar solvents or Aqueous cleaners.as these will damage the transparent window.

Chamber Cleaning

- Open the DOOR as you would normally.
- Remove all trays or shelves.
- Clean the base of the chamber with Hot Water. Do not use an abrasive cleaner or one which may leave soluble residues that would remain in the pipework and contaminate the water.
- Take Care not to damage the sensors , or to displace them in any way. This is especially the case with the Over-temperature Thermostat bulb which is fitted onto the heater and connected to the chamber wall by a very thin copper tube.
- Wash the sensors with hot water and a soft cloth.
- Turn on The Chamber Drain Valve to drain water from the chamber. Rinse if required with clean warm water.
- Dry the chamber with Paper or Cotton Towels. Do not leave fragments of paper or lint behind.
- Wipe the Gasket with a wet cloth moistened with a little detergent.

STEAM GENERATOR**STEAM GENERATOR CONTROLS****POWER ISOLATOR SWITCH**

Turns on power to the machine.
(shared with main machine)

OVER TEMPERATURE cutout .

This is sited to the rear behind the panel

STEAM Pressure Control

This is sited to the rear behind the panel

'HEAT' SWITCH

Turns on power supply to Heater system

'POWER' lamp

Shows power on to control system

'HEATING' Lamp #1

Shows power is on to Main Heaters

"HEATING" Lamp #2

Optional

'LOW WATER' Lamp

Shows water level is too low &
power is off to Heaters

'LOW WATER' Buzzer

(Optional-) audible alarm

**GENERATOR PRESSURE. GAUGE Circular
100mm Pressure Gauge**

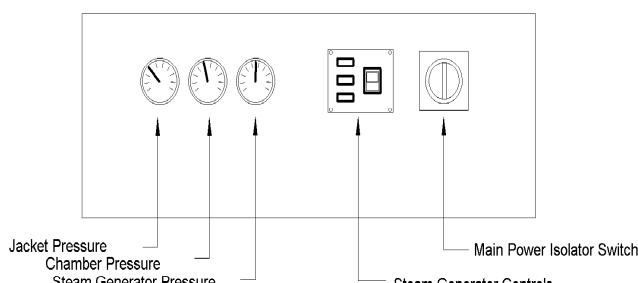
Dial Bourdon pressure gauge (Accuracy +/-1%)

BLOWDOWN/DRAIN valve

This is the hand valve accessed from the lower rear of the machine. The exhaust from this valve is directed into the main outlet drain. Or to a separate Blowdown Outlet pipe.

SAFETY VALVE

This is the safety Valve protecting the Generator.
It exhausts downward at the rear towards the floor.

**SECURE-TOUCH + SWIFTLOCK****Water Supply**

The quality of water will affect the operation and life of the elements.

Where hard water is used the elements will require frequent replacement or descaling

The water supply should ideally comply with the following specification;=

Total hardness CaCo₃	Max 2
p.p.m	

Caustic alkalinity CaCo₃	
Max 300 p.p.m	

Total Dissolved solids	Max 2000
p.p.m	

PH	8 –10
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Water Supply Connections

The water supply is drawn from the internal tank in the sterilizer.

DRAINAGE CONNECTIONS**CONDENSATE**

There is no separate condensate outlet- this is shared with the internal tank in the sterilizer and condensate eventually finds its way out of the main drain outlet.

BLOWDOWN

This controlled by is a manual valve fitted close to the generator. It is provided with an outlet pipe to permit blowing-down the generator.

1 COMBINED WITH MAIN DRAIN OUTLET

This is a 35 or 50 mm copper drainage outlet pipe projecting from the rear of the STERILIZER .It must be plumbed into a building drain , and in normal daily operation carries water with a temperature of up to 60C

When the Steam Generator is blown down this requires that the drainage system can cope with water flashing to steam at or above 100C.

Where the drainage system and regulations allow this arrangement then it is important that venting of the drain lines is adequate to avoid pressure building up in the drainage system.

Where required by regulations or site requirements the Generator drain may be separate from the main drain.- please see Steam Generator Manual.

The outlet pipework should be free-draining and have a downward slope of a minimum. of 1- in 50 and should not be reduced in diameter. If the length is to exceed 10 metres the whole of the length of

2 SEPARATE GENERATOR BLOWDOWN-DRAIN

This is a ½" /15mm outlet from the drain/Blowdown valve. It is separate to keep blowdown steam away from the main drain. Arrangement of this outlet to a suitable drain is dependant upon local regulations. Typically It should be connected to a suitable blowdown tank or similar arrangement to permit safe discharge of high-temperature, pressurised contents. Care should be exercised to ensure that any such blowdown arrangement complies with all relevant building, safety, and insurance regulations.

IMPORTANT

If in any doubt about the regulatory requirements of the installation on this subject please consult Astell Scientific or your local agent.

Steam Pressure Control

The steam pressure is controlled by a single pressure switch mounted inside the sterilizer cabinet which is set to the desired pressure. The Differential is set to minimum.

This turns the heater contactor on and off. To maintain the set pressure.

When the Main heaters are on the "HEATING" lamp is illuminated.

Boost System (optional)

The steam pressure during standby /control is controlled by a "Control" pressure switch mounted inside the sterilizer cabinet which is set to the desired running pressure. The Differential is set to minimum.

This turns the Main heater contactor on and off, to maintain the set pressure.

When the Main heaters are on the "HEATING" lamp #1 is illuminated.

The steam pressure during Heatup is controlled by a 'Heatup' pressure switch which is set to a pressure slightly below the Control Pressure setting. The Differential is set to minimum.

This turns the BOOST heater contactor on and off. . The effect is that during heatup the power is boosted , but just before control the Boost heaters turn off, and control is maintained on the main heaters only. When the Main heaters are on the "HEATING" lamp #1 & "HEATING" lamp #2 are both illuminated.

OVERTEMPERATURE CONTROL

The system uses a HYDRAULIC THERMOSTAT(2 on Boost Heated models) set to about 225-250C with the Adjustment Knob sited inside the cabinet on the side of the HEATER POWER CONNECTION BOX . The thermostat has a sensor bulb mounted in a clip clamped above one of the Heater Elements. In

the event of the water level falling low enough to expose the immersion heater elements, the temperature of the heater will rise and the thermostat bulb will operate the Thermostat contacts. This turns off power to the Heater system.

The standard arrangement is that the Overtemperature cutout is self-resetting. Manual- Reset cutout versions are available as an optional extra.

WATER LEVEL SENSORS

Water Level is controlled by two Float Switches and a pump up/down system.

When the water level is below the bottom limit the Float Switch makes & a Timer relay starts. After a few seconds (an anti-bounce control) the Feed-Pump turns on forcing water into the generator until Upper limit is reached & the Float switch turns off, when the pump stops.

If there is a problem ad the water level falls too far & generator will run dry. A LOW LEVEL float switch will operate and shuts down the heaters and lights the "LOW WATER" lamp (and also sounds the buzzer alarm if fitted)

In combination with the Heater-mounted Overtemperature cutout this arrangement provides an improved fault detection and protection system.

During start from completely dry the low water alarm will sound if either the pump has sucked all the water out of the tank, or if the feed pump period exceeds the timer setting.

Starting Generator System

NORMAL STARTUP-

WITH WATER PRESENT IN THE BOILER.

- 1 Ensure that the water supply is operating correctly .
- 2 Turn on the Sterilizer
- 3 Turn on the HEAT switch on the Steam-Generator control panel
- 4 The Low – Water lamp should not light.
- 5 The Feed pump may be heard to take on water. This is correct.
- 6 The heaters will turn ON and the Pressure will rise to the Control Pressure

DO NOT RUN A CYCLE UNTIL THE STEAM PRESSURE HAS REACHED THE SET OPERATING PRESSURE.

**DRY STARTUP- WITH NO WATER PRESENT IN THE BOILER.
(E.G., AFTER A BLOWDOWN)**

- 1 Ensure that the water supply is operating correctly .
- 2 Turn on the Sterilizer
- 3 Turn on the HEAT switch on the Steam-Generator control panel
- 4 The Feed pump may heard to take on water.
- 5 The Low – Water lamp will light and buzzer may sound
- 6 The LOW WATER lamp will turn off – Feed Pump continues.
- 7 The heaters will turn ON
- 8 Feed Pump stops
- 9 Temp.& Pressure will rise in the steam generator to the Control set Pressure

DO NOT RUN A CYCLE UNTIL THE STEAM PRESSURE HAS REACHED THE SET OPERATING PRESSURE.

MAINTENANCE

The European PED and many similar regulatory regimes require the user to set out and comply with a formally agreed maintenance procedure. .

This information is provided in good faith to assist this process but it is the user's responsibility to ensure that all statutory regulations are complied with.

BLOWDOWN

Carry out the Blowdown procedure as described at the intervals agreed with your Service Agent or in agreement with Astell Scientific.

WEEKLY

Check operation of Steam Generator safety valve By operating handle on valve.

3-MONTHLY

Check operation of safety valve.as above
Carry out Blowdown procedure.

Steam Generator Blow-Down

Blowdown is the process of blowing out a portion of liquid boiler contents under partial pressure , intended to help reduce the build-up of sludge and scale in the generator.

HOW OFTEN TO BLOWDOWN?

Typical blowdown frequencies range from 1 per day to 1 per 20 days, depending upon site conditions . Please consult the manufacturer for advice.

WARNING ! Blowdown can be hazardous

Before attempting blowdown ensure that all procedures and arrangements for a safe Blowdown have been carried out, particularly that the drainage system is safe and designed to accept the steam and hot water produced by the blowdown.

As the performance of this task is outside our control , Astell Scientific or its agents cannot be responsible for any loss or damage caused by the user as a result of a blowdown operation.

1 Turn OFF the HEAT switch and allow pressure to fall to approx 0.6 Bar (7-10 PSI)

OR

Carry out Startup procedure and when pressure reaches approx 0.6 Bar (7-10 PSI) turn OFF 'HEAT' switch.

2 Open the BLOWDOWN VALVE for approx. 5 seconds.

3 Close the BLOWDOWN VALVE

4 Turn ON the HEAT switch. This is then ready for normal operation.

It is very hazardous and not advisable to blow down from >0.6 bar or worse, full operating pressure.

Special BLOWDOWN VESSELS are available to safely capture the contents of the steam generator. If your machine has one of these please consult ASTELL for more detailed instructions.

Steam-Generator Safety Valve Testing

(On many installations this discharges out onto the floor , so keep away from the rear of the machine and warn other people of the resulting noise.)

VALVE CLEARANCE - FUNCTIONAL TEST

Remove rear panel/sidepanel to gain access to safety valve on generator.- Consult Astell if not sure of where this valve is positioned.

Operate **safety valve lever** for 1-2 seconds. Steam should discharge normally through safety valve outlet.

FULL OPERATIONAL TEST

With Sterilizer on standby/ready, not during a cycle:-

- Remove rear panel and locate the CONTROL PRESSURE SWITCH for the generator.
- Read pressure switch setting and Record for future resetting.
- Adjust setting to above 6.5 Bar.
- Allow pressure to rise. When pressure reaches between 6.0 - 6.5 Bar the safety-valve should vent steam.
- & It should close again before 6.0 Bar

IF THE SAFETY VALVE DOES NOT OPEN & VENT AT THE STATED PRESSURE IT MUST BE CHECKED AND ADJUSTED BY A QUALIFIED ENGINEER.

- Once the valve has operated correctly , Re-Adjust pressure switch setting to setting previously recorded.
- Allow to Cool to normal set pressure
- Check that Steam Generator returns to control at the normal pressure.

Do NOT operate the machine until the Steam Pressure is at the normal operating setting

SAFETY & DOOR INTERLOCKS - INSPECTION

This Sterilizer is fitted with safety interlocks to prevent the opening of the Cover when the chamber is pressurised, and to prevent pressurization if the Cover is not fully closed.

The U.K. Health and Safety regulations stipulate that the closure system and interlocks shall be inspected at regular intervals by a competent person , and that all operators shall be trained in the use of the Sterilizer controls, operating procedures, and the function of safety devices.

DOOR INTERLOCKS

The door is held in the Locked position by a y retracting Locking Pin . This is fitted with 2 or 3 sensor Pneumatic Switches arranged to enable the heating and control system only when the door is closed and the handle rotated into the locked position . With the cover open or not fully locked heating is disabled. The locking Bolt system is continually monitored by the control system.

EMERGENCY UNLOCKING

If the door becomes Jammed or in the case of a Power Failure, The Door can be manually unlocked.

WARNING!!!

The Chamber Must be cool- (below 50C is advised) and Pressure on Dial Gauge Zero.

There are two different locking bolts that are fitted on these machines. Please ask Astell which version you have.

Type 1 PNEUMATIC BOLT.

The instructions on how to open the door vary from model to model and are not provided here- These are available from the Astell Service dept. on request./

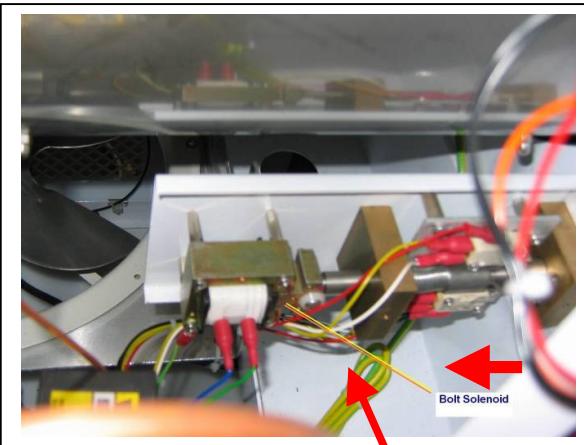
Type 2

ELECTRICAL "SWIFTLOCK" SOLENOID BOLT

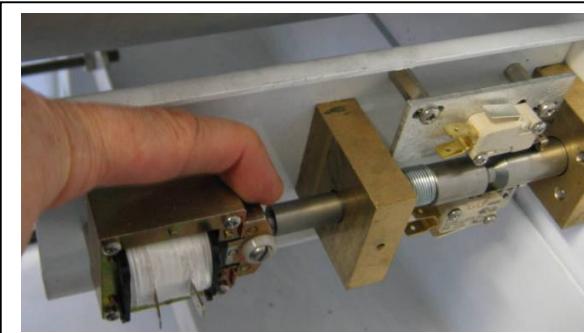
Remove the cover panel on the side of the machine –on same side as the hinge

Look inside and you will see the Locking Bolt as in the photos below.

Turn OFF power,. Put your hand inside and withdraw the sliding bolt as shown, whilst someone else rotates the door handle to open the door.



Push bolt back with your hand



PERIODIC MAINTENANCE

There are very few moving or wearing parts in this sterilizer , HOWEVER , It is essential that the unit is kept clean , especially the water in the tank or Chamber and the Gasket.

A GASKET

Keep the mating surface of the Chamber flange clean. This bears on the gasket to seal the Chamber If necessary apply a little Silicone Grease.

Check that gasket is not bulging out of the groove and, and that the edge is smooth without any cuts or abrasions.

IMPORTANT- Check that the gasket is fitted correctly - the small "Holes" should be on the outside lip.

Replace Gasket regularly

Astell advise that the Gasket will require replacing at 12 month periods – or 6 months if the machine used intensively or for many high-temp cycles..

B CLEAN CHAMBER

Clean out chamber and inspect for damage to sensors etc

C CLEAN TANK –

Drain water from tank and rinse out with clean hand-hot water. Do NOT use any detergent. Detergent will contaminate the feed water and will cause foaming problems in the tank .

D DOOR INTERLOCK TESTS

Carry out the Door Interlock test described on previous pages.

If necessary lubricate locking pins with a little Disulphide high-temp grease.

E SAFETY VALVE TESTING

ASTELL SCIENTIFIC advise that the safety valve musty be regularly tested At intervals of **NOT MORE THAN 3 MONTHS**

NOTE:- There is a hand-operated actuator on the safety valve which allows it to be manually triggered for testing. This is NOT adequate as a test of the safety valve. This must be done by operating the machine with a suitable Cycle –

Safety Valve Test Quick Reference

IMPORTANT *
THE MACHINE MUST BE ATTENDED AT ALL TIMES UNTIL TEST IS COMPLETED.

TOUCH



SELECT "SETTINGS"

TOUCH



SELECT "SITE ENGINEER"

ENTER "333333"

SELECT "EDIT MACHINE SETTING"

SELECT "TEST CYCLE"

(**Background Turns Green**)

TOUCH



(3 Times = Return To Main Menu)

CLOSE & LOCK DOOR

TOUCH "START"



SELECT "TEST CYCLE" ON MENU

TOUCH "START"

(To Start Cycle)



TEST CYCLE IS NOW RUNNING

Follow prompts on display. At 121c & 134c Points ,touch []. When steam is seen coming from the safety-valve outlet, touch [] to advance machine into cooling.

Note- depending on model the safety valve may operate by exhausting a blast of steam or by a continuous steam flow thro the valve

**LEAVE UNTIL COMPLETE
& THEN OPEN DOOR**

IF THE SAFETY VALVE DOES NOT OPERATE AT THE STATED PRESSURE IT MUST BE CHECKED AND ADJUSTED BY A QUALIFIED ENGINEER.

THERMOCOUPLE ACCESS PORTS

A Screwed Thermocouple access port is provided as standard for Testing Thermocouples

This comprises a HEX.THERMOCOUPLE PORT COVER CAP which screws onto a male fitting. There are slots in the sides of the male fitting to allow the wires to emerge under the cap. The cap clamps a 12mm silicone seal against the hole in the male fitting. The seal deforms around the thin thermocouple wires.

Front-Load models:-

The port is fitted at the Left-Hand side of the machine approx on the boiler centre line (Remove the Small cover for access)

Top--Load models:-

The port is fitted at the RH side of the machine on the boiler side . Remove the Small cover for access

Where a blank has been supplied in place of the adaptor, you will need to fit the optional adaptor yourself.

Remove the fitting blank and fit the Astell adaptor.

FITTING THIN-WIRE “TESTING” THERMOCOUPLES

To insert test thermocouples in the fitting release the Cover-cap nut and remove the seals. Pass the thermocouples through the split seal and out one side slot , with the other seal on top. Fit the cover cap nut and tighten to seal..

LOAD SENSING PT100 SENSORS

FITTING REPLACEMENT PROBES

The Flexible Armoured Probe has a short rigid tube at the Chamber Wall end. This is fitted through a threaded Compression fitting in the chamber wall .

Load Sensing probe replacement;-

- Remove the appropriate cover from the case to give access to the probes.
- Locate the LOAD SENSE probe fitting. and make a note of the connections to the cable going to the Controller
- Hold the probe fitting and loosen the compression nut on the INSIDE of the Chamber- this fitting is fitted the "wrong-way-round" with the compression joint on the INSIDE. The Compression-olive will be compressed hard onto the armoured probe tube-end, and this means that the old olive and possibly the Compression nut must be replaced with new items every time the probe is changed.
- The probe is installed by passing the wire and end-tube through the compression Nut and olive and then through the fitting from the inside, and the compression Nut and olive fitted on the Inside of the chamber .
- DO NOT pull on the cable or damage the insulation on the inside of the fitting. Where supplied the silicone sleeved part of the wires should be inside the fitting to act as a cushion against abrasion. Tighten finger-tight , then tighten further with a spanner.. A little Silicone Joint Compound may be smeared onto the olive beforehand, but DO NOT put silicone sealant on the Compression nut or threads.
- Reconnect new PT100 sensor to match the one that was removed.

FUSES

INTERNAL SYSTEM FUSES / TRIPS-

THERE ARE NO USER-SERVICEABLE PARTS INSIDE & FUSE FAILURE or MCB TRIPPING INDICATES A TECHNICAL PROBLEM WHICH SHOULD BE SOLVED BEFORE THE FUSE IS REPLACED OR TRIP RESET

Low Voltage high current Hazards

The Switch-mode power supply produces 24 volts DC at up to 2 or 5 amps. it is short-circuit protected but during servicing ensure that no fluids or foreign bodies are brought into contact with the circuit boards or damage may be caused.

FUSE REPLACEMENT

Consult manufacturer before replacing fuses

To comply with safety requirements use only manufacturer's recommended fuses . Use only Ceramic HRC fuses in mains power circuits (where specified)

COMMISSIONING AND CYCLE SETTING

This section describes how to derive the settings that you may need to enter for your intended Cycle(s) . The description applies to Media Loads or Discard Loads but a similar approach can be applied to Instrument/Glassware.

A "CYCLE" consists of three process sections plus Cool Lock settings. Each of these is independently selected and adjustable,

- HEATING AND AIRPURGE at around 100C Purges the air from the chamber.
- HEATING AND STERILIZE at Setpoint Temperature for Selected Time
- COOLING LOCKS Set Temperature.

The Cycle Values can be determined by trial-and-error, but as this can be very long and involved, it is best to use a chart recorder to investigate the Temperature - Time behaviour of the load. A number of settings must be made:-

AIRPURGE

The Airpurge Time depends on the nature of the load . Items such as small quantities of Bottled Fluids , Trays or Racks, Solid items, Bowls, etc have low thermal mass & do not trap much air, and will sterilize quite satisfactorily with minimal, typ 5-7 minutes of AIRPURGE TIME. However , larger loads with larger bottles of fluids, boxes of bottles, Phials , Petri dishes, etc have a large thermal mass and trap a great deal of air . These ALWAYS need a longer AIRPURGE time of typically 15 - 30minutes. The **AIRPURGE** time should be set to give at least **5 minutes of active AIRPURGE during which steam will be visible emerging from the Exhaust**

Insufficient AIRPURGE causes excess pressure in the chamber for the temperature, and higher peak-peak fluctuation in temperature which will trigger the "Chamber (or Load) Temperature Fall " message.

DETERMINING SUITABLE STERILIZE & AIRPURGE TIMES

The chamber will heat-up to sterilize Temperature before the load catches - up, and this time delay must be accounted for to ensure correct sterilization. The LOAD SENSED TIMING OPTION (Where it has been fitted) compensates for the time-lag automatically and only requires the Sterilizing Time to be entered.

If the time-lag for the load to catch up with the chamber is known, or can be adequately estimated then this may be added to the desired Sterilizing Time and the total set as the STERILIZE TIME for the Cycle.

In most cases the behaviour of a load in this arrangement is unknown, so it is necessary to use a chart recorder or multi-thermocouple indicator to monitor the load, and find the ideal AIRPURGE and Sterilize times.

TEMPERATURE RECORDER OR DATA-LOGGER

for COMMISSIONING MEASUREMENTS

Arrange a multi-pen Thermocouple CHART RECORDER or indicator to monitor the temperature in the load and in the chamber.. For a complex load, the steam penetration is slowest into the more enclosed parts , such as the centre of stainless steel buckets. In this case, the very centre of each container should be monitored with the sensor inside a load item (e.g.:- a Petri dish).. Other points throughout the load may be monitored depending on how many thermocouple sensors are available. If desired sterilizing monitor tapes or spore strips may be distributed throughout the load.

LOAD SENSING OPTION

The Process to determine the Time Settings differs if LOAD SENSED TIMING Option is fitted and selected. If it is available on your machine, you must decide whether it is necessary or desirable to use it or to select the simpler timing system
You should choose to use this if the heatup time of the load may vary from cycle to cycle, e.g. if the size of loads varies widely. :-

- LOAD SENSED TIMING SELECTED & FITTED ; Please See later section
- LOAD SENSED TIMING NOT FITTED ; Please follow the instructions below.

SETTING TIMES AND PARAMETERS WITHOUT LOAD SENSED TIMING

1] Select the desired CYCLE and set values as follows:

AIRPURGE TIME

For loads which require long AIRPURGE - 30 min see AIRPURGE above

For loads which DO NOT need a long AIRPURGE - 10 min see AIRPURGE above

STERILIZE TIME 60 minutes

STERILIZE TEMPERATURES :

For loads which are NOT Temperature Sensitive it is recommended that the temperature is set to approx. 2 to 3 Deg C above the temperature at which sterilizing is required .This will help to speed up the process and to ensure adequate sterilization effectiveness.

For loads which Are Temperature Sensitive e.g. MEDIA it is recommended that the temperature is

set to the temperature at which sterilizing is required as excess temperature may damage the media..

COOLING LOCK (Programmable)

Set Cooling Temp. to 100C

COOLING LOCK – internal preset thermostat

Record any setting for future reference, then Set to MINIMUM (a/cw) on dial.

2] Start the Cycle cycle running.

3] Chamber and load temperatures will rise towards 100C,

AIRPURGE timer will start

Note down the Airpurge Time reading shown on the DISPLAY at the time when the "Slowest " Load Testing Thermocouple exceeds 95C. [Call this time display reading "T1".]

4] At this point, press The [STOP] button and select " Stage Change?"

5] Chamber will heat to Sterilize.

6] STERILIZING Stage will start . The Temperature will control at the set Sterilizing Temperature.

Note down the "STERILIZE TIME" shown on the DISPLAY at the moment when the SLOWEST test thermocouple in the load reaches an acceptable temperature for sterilizing to occur.

[Call this time reading "T2"] Using the Timer Display as a clock wait a further measured period, equal to the desired STERILIZE TIME (For example, this might be 15 minutes.).

7] At this point, press The [STOP] button and select " Stage Change?"

8] 'COOLING' mode will begin, as shown on the display.

9] PROGRAMMABLE COOLING LOCK.

You should have Set the PRESET COOL LOCK THERMOSTAT dial to Minimum .

The load will cool down slower than the Chamber Temperature Display; Monitor the load temperatures on the Recorder/Indicator and note down the Displayed CHAMBER TEMPERATURE at the moment when the HOTTEST part of the load has cooled to a temperature safe to handle. Call this "CYCLE COOL-LOCK TEMP"

10] PRESET COOL LOCK THERMOSTAT

It is important to Correctly Adjust the PRESET COOLING-LOCK THERMOSTAT. However, it can only be set to One Temperature, which should be that required for the worst-case Cycle from a point of view of operator safety.

Monitor the load temperature as it cools and when it falls below a safe temperature to handle (usually 80C) rotate the PRESET COOLING LOCK

THERMOSTAT KNOB Clockwise very slowly until the display changes to show 'COMPLETE'. The reaction time of the system may be up to 10 seconds so carry out this in small steps of 2C at a time., waiting 10 seconds between steps.

Leave the dial in the finished "COMPLETE" position. Record the reading of the knob on the dial against the scale, for future reference purposes. This will normally be somewhere below 80 C probably around 55C, as the chamber wall cools much faster than the load, but slower than the chamber temperature display.

11] COMPLETION of CYCLE

Unload the Sterilizer and submit any test-strips to examination / Incubation, etc ; These should all indicate satisfactory sterilization. If this is not the case, it is possible that steam penetration into the load is restricted by load Packaging (Plastic bags, boxes, or Paper Wraps are possible culprits) or air is remaining in the load .The loading technique may require modification;- Try a smaller number of items per container , different containers, Wrapping or bags, and ensure that any bags have the tops opened before autoclaving, or consult the Manufacturer for advice on improving the steam penetration.

ENTERING THE VALUES THAT YOU HAVE DETERMINED

Log in as Site engineer. Go to Customer Cycle edit

Enter the CYCLE VALUES into the Cycle Stages Settings :-

STERILIZING TEMPERATURE has already been set at the start of the test and does not need to be changed. Leave it as it is

To ensure that sterilizing conditions are met, the temperatures should all be amended as follows to allow for calibration tolerances before setting into the profile :-

AIRPURGE TIME - Set to the time measured, from the start of airpurge Period to all points in the load reaching 95C. (at this moment the display was Recorded as "T1").

AIRPURGE TIME = ((Original Time Set) - T1) minutes

e.g. If "T!" was Display=2.00, then :-

8 min - 2 min = 6 minutes airpurge time to set in Cycle profile

STERILIZE TIME - Set to the total of the time taken for the load to catch-up to sterilize temperature , added to the desired Sterilize Time in minutes.

The Catch-up time is the original set sterilize time , less the reading taken as "T2"

STERILIZE TIME = (set Sterilize time - T2) + (Desired Sterilize Time) minutes

e.g. If "T2" was Display=51.00, then ;
 $(60 \text{ min} - 51 \text{ min}) + 15 \text{ min} = 24 \text{ minutes}$ Sterilize time to set in Cycle profile

COOLING LOCK SETTINGS

COOLING TEMPERATURE :

Set this Parameter to the Temperature recorded during the test as "CYCLE COOL LOCK TEMP"

NOTE:-If this setting has already been determined for a different Cycle, the Final setting must be left at the LOWEST temperature of those determined for all Cycles.

SETTING PARAMETERS with LOAD SENSED TIMING

SETTING UP WITH LOADSENSE TIMING OPTION FITTED

The Load Sensed Timing system detects the Load temperature , and automatically allows for the time-lag caused by the load delay in reaching sterilize temperature.

Set up the system as described above for the system Without Load Sensing, but with the following detail changes ;-

- a) Set STERILIZE TEMPERATURE to the temperature at which the load is to be Sterilized . The control system automatically raises the actual initial sterilize temperature a little & causes the Sterilizing Timer to start when the load is equal to the Sterilizing Temperature setting., equivalent to the desired Sterilizing Temp. Then the sterilizing temp returns to normal.
- b) Set the STERILIZE TIME to the Actual DESIRED STERILIZE TIME.
- c) COOLING LOCK (PROGRAMMABLE) Set Temperature to 100C
- d) COOLING LOCK (INTERNAL PRESET THERMOSTAT - Record any setting for future reference, then Set to minimum on dial.
- e) LOAD SENSING Set To "ON" in Cycle profile – Set Load temperature to the same as the STERILIZING TEMP.

Carry out stages 1 to 5 as described above for normal cycles, "without Load sensing"

In place of stage 6, The Chamber Temperature will heat to the Set Sterilizing Temperature, The Sterilizing timer is stopped.

When the load reaches the Set Temperature the Sterilizing Timer will START , and the cycle will proceed

. (It is not necessary to note down any value or time .)

Omit Stage 7 completely (the cycle will proceed under automatic control).

Carry out stages 8,9,10,11 as described above.

Log in as Site engineer. Go to Customer Cycle edit

Enter the CYCLE VALUES into the Cycle Stages Settings ;-

AIRPURGE TIME -

Set to the time measured, from the start of the AIRPURGE Period to all points in the load reaching 95C.

AIRPURGE TIME = ((Initial set AIRPURGE Time) - T1) minutes

STERILIZE TIME - Leave this Set to the time entered as STERILIZING TIME during the above test .

However, If the results of the measurements indicate that , for one or more of the load points measured, the time spent above the "Ideal" sterilizing Temperature would be only just sufficient for sterilization then the Sterilizing time may be increased a little to suit .

SETTING COOLING LOCKS with LOAD SENSED TIMING OPTION

When Load Sense Timing is selected .-

COOLING LOCK TEMPERATURE

The **LOAD SENSING** option when selected changes the **COOLING LOCK** to a mode which detects the Temperature of the Load itself via the **LOAD SENSING PROBE** , instead of sensing the temperature in the chamber rear wall forming a Dummy Load..

Set the Cooling Temperature to the actual Temperature of the LOAD at which the Cooling Lock is to RELEASE and allow the door to be opened. It is advisable to err on the Cooler side , for safety.

Because the lock senses the actual load temperature there is no compromise , estimation or guesswork required to select the cool lock release temperature

FREQUENTLY ASKED QUESTIONS

Q Screen Contrast wrong. The screen is set up for viewing straight on. If viewed at an angle the contrast will change **The Screen contrast is adjustable - See Programming Manual**

Q The RCD earth leakage trips in the supply for the machine a keep tripping out.

A The type of heater used in this machine means that Operation from a RCCD residual or earth-leakage trip may cause tripping problems ., This may occur especially if the machine is not operated for some time and is due to moisture ingress to the Inconel-Sheathed heaters. If this happens connect to a non- protected supply and run for 5-10 cycles. Then revert to Protected supply. If the tripping then continues please consult the manufacturer.

Q Why cannot I operate a control and Fast-Exhaust the steam when I want to?

This action would however probably be dangerous and could be in breach of health and safety legislation. Firstly the amount of steam produced when a chamber pressurised to 120C is exhausted is very large and constitutes a serious hazard.. Unless special high temperature exhaust pipework is installed in the building to take this exhaust away top a safe discharge , then this would be unsafe. If the load being processed contained any fluids then the action of exhausting the steam from 120C would cause all the fluid load to flash-boil. This would cause the load to violently boil over & empty the load contents into the chamber, which quickly will "gum-up" the valves and pipework. Also if such a load was removed even after it had appeared to stop boiling over then it would be very likely to flash-boil again into the face of the user carrying the load.

Q I have locked the Handle when Open

A Press the DOOR button follow instructions and rotate the handle to the Unlocked position

Q Power On but Display does not light

A Check that the Power Switch is ON For Emergency Stop switches Use the key to release the Button to the ON position. Check that the unit is plugged in and there is power available at the Mains Socket. If these are all OK call service engineer.

Q Difficult to close Door against gasket (1)

A This could be trapped air expanding. If chamber is still Very hot allow to cool down and try again.

Q Difficult to close Door against gasket (2)

A If gasket is more than 6 months old consider replacement.

Q Steam leaks from around Gasket (1)

A Gasket MUST be fitted correctly into Groove and must have no damage to the edges of the lips or cuts or abrasions. The opposite Sealing face that it touches must be clean with no cuts or damage.

Q Steam leaks from around Gasket (2)

A Possibly Gasket needs replacing -it must be replaced before the silicone rubber loses its sealing properties- any time after 6 months of use.

Q Gasket has been changed but steam leaks

A Gasket MUST be fitted correct way round- there are small holes in the gasket lip **These must be on the OUTSIDE edge.**

Q Cycles that are provided pre-set as delivered are not suitable for my loads.

A Consult the sections on selecting Times , temperatures , etc, then in SUPERVISOR level enter the new Cycle values you require.

Q Delayed Start would be useful / is Not Required

A Turn ON or OFF Delayed Start - See *Programming manual*

Q I have started the wrong Cycle

A Press  button ,Enter supervisor or Site Engineer Password & select Stage Jump. Then Select jump to Cooling. Allow to cool, open, close and start correct cycle

Q I have Changed and Forgotten the Passwords (Security Codes)

A There is a way to view or reset these- Consult Astell

Q The Load comes out WET and I need it to be DRY

A This is not possible with a machine- if it does not have a full Jacketed Drying function- IF your machine has Full Jacketed Drying please Contact your service agent for Diagnosis.

Q Cycle Does not offer “Drying Time” setting

A This will be the case if the Selected Cycle does not use DRYING (eg fluids loads) or the machine does not have a Drying function

Q “Safety Valve Test Overdue” appears

A You have not carried out a safety valve test. See “Safety Valve testing” section

Q My Printer does not print properly

A See PRINTER FAULTS in the “OPTIONAL PRINTERS” section

Q How Do I Clean the Machine?

A See “Maintenance & Cleaning” section

Q I Need to manually Unlock the door

A Please see the photo-instructions in the section “Manual Unlocking”

Q My Machine needs to be calibrated

A You will need a Calibration organisation who can carry out the appropriate tests with Known Calibrated Thermometers and Pressure gauges.

Astell Scientific or your Agent will be able to assist, and Astell provide a separate manual on calibration -“ Engineering & Calibration Manual “ this is available as a PDF file on request.

MXN785_p0 B&R ENGINEERING_calibration.pdf

SPARE PARTS AND SERVICE

When ordering spare Parts or requesting Service Assistance please provide

- 1 the SERIAL NUMBER**
- 2 the MODEL NUMBER –**

These are found on the RATING PLATE fixed at the rear of the machine .

Use only approved ASTELL SCIENTIFIC spare parts , The fitting of Non-Astell-approved Parts will render this machine Non-Compliant with the E.C./ E.U. E.M.C. and L.V. and the P.E.D. Directives and will void any CE mark.

Continued use of a machine which does not comply is an offence under / E.U. law.

CERTIFICATION

A Certificate of Examination is supplied with every Sterilizer. This meets P.E.D requirements & includes details of Chamber etc. relating to the pressure vessel, specifies the design pressure, the test pressure to which the Chamber was subjected during manufacture, and the date of the Pressure Vessel testing , which will be required by an insurance company..

Please note that this equipment comes under the requirements of the CE Pressure Equipment Directive and your machine will certainly need insurance cover and regular inspections. Most QA systems require a formal maintenance contract in place and regular calibration must be carried out .

It is a statutory requirement of the U.K. Health & Safety at Work Act and in many other countries that Sterilizers be thoroughly inspected by a competent person prior to use (usually an Engineering Surveyor from an Insurance Company) , and at least every 14 months thereafter. (Section 35(5) of the Factories Act 1961.)

The information on the Test Certificates will be required by the Inspector, and you are advised to take good care of your Certificate.

Test certificates for Electrical safety and Calibration of the control system are supplied as standard, Full test analysis results are available to special request.

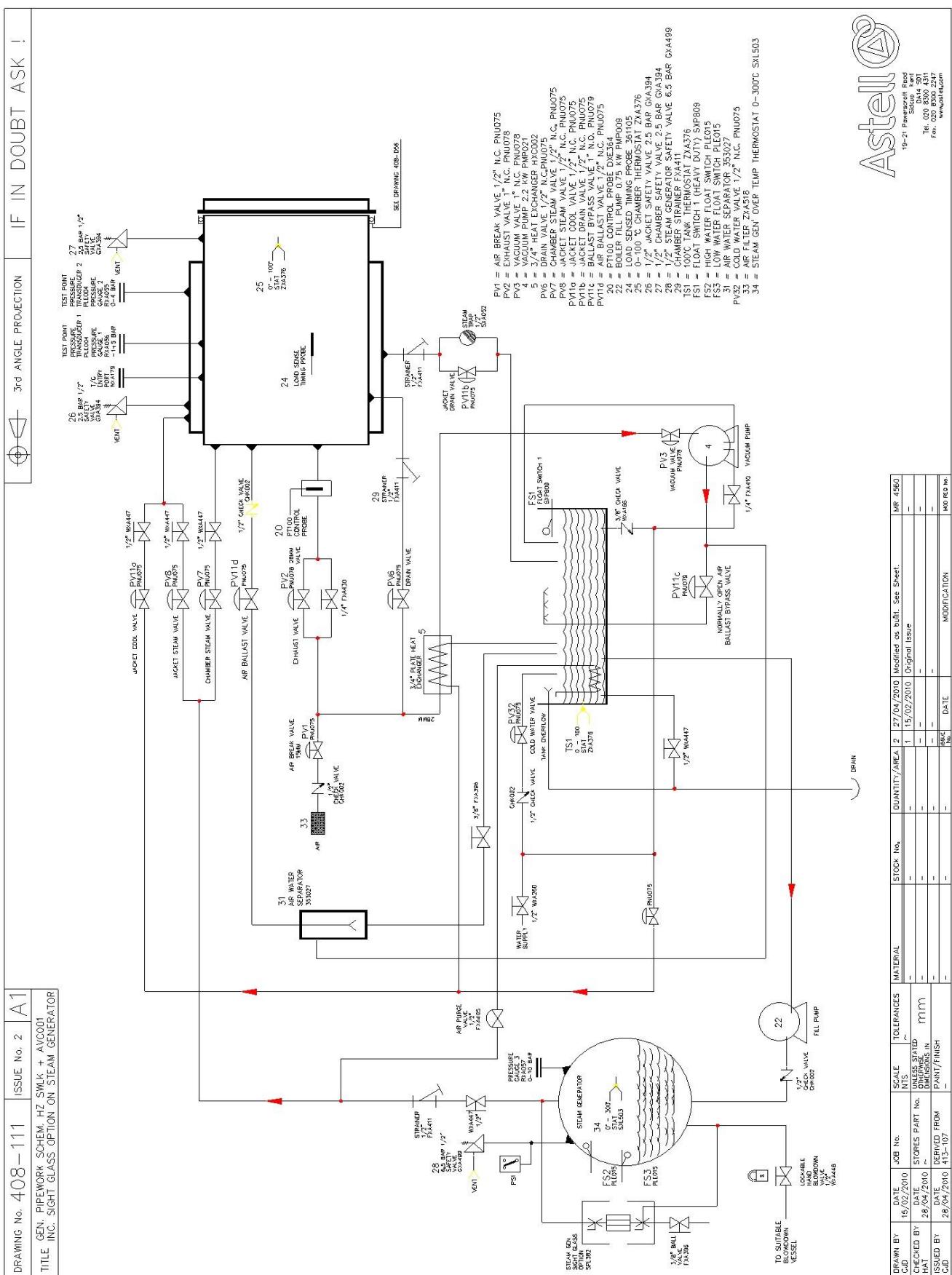
Pressure Temperature Correlation**Pressure/Temperature Calibration**

This chart shows Pressure and Temperature correlation for Saturated Steam, and the Maximum/Minimum acceptable Temperature display Values for a Correlation Accuracy of +/- 2%. It applies to ASTELL Sterilizers only.

Pressure BarABS	Temperature Deg C	Temperature - Tolerance Min Temp	Max temp
1.650	114.51	112.22	116.80
1.700	115.40	113.09	117.71
1.750	116.28	113.95	118.61
1.800	117.14	114.80	119.48
1.850	117.96	115.60	120.32
1.900	118.80	116.42	121.18
1.950	119.63	117.24	122.02
2.000	120.42	118.01	122.83
2.037	121.00	118.58	123.42
2.050	121.21	118.79	123.63
2.100	121.96	119.52	124.40
2.150	122.73	120.28	125.18
2.250	124.18	121.70	126.66
2.300	124.90	122.40	127.40
2.350	125.59	123.08	128.10
2.400	126.28	123.75	128.81
2.450	126.96	124.42	129.50
2.500	127.62	125.07	130.17
2.550	128.26	125.69	130.83
2.600	128.89	126.31	131.47
2.650	129.51	126.92	132.10
2.700	130.13	127.53	132.73
2.750	130.75	128.14	133.37
2.770	131.00	128.38	133.62
2.800	131.37	128.74	134.00
2.850	131.96	129.32	134.60
2.900	132.54	129.90	135.19
2.950	133.13	130.47	135.79
3.000	133.69	131.02	136.36
3.050	134.25	131.57	136.94
3.100	134.82	132.12	137.52
3.150	135.36	132.65	138.07
3.200	135.88	133.16	138.60
3.250	136.43	133.70	139.16

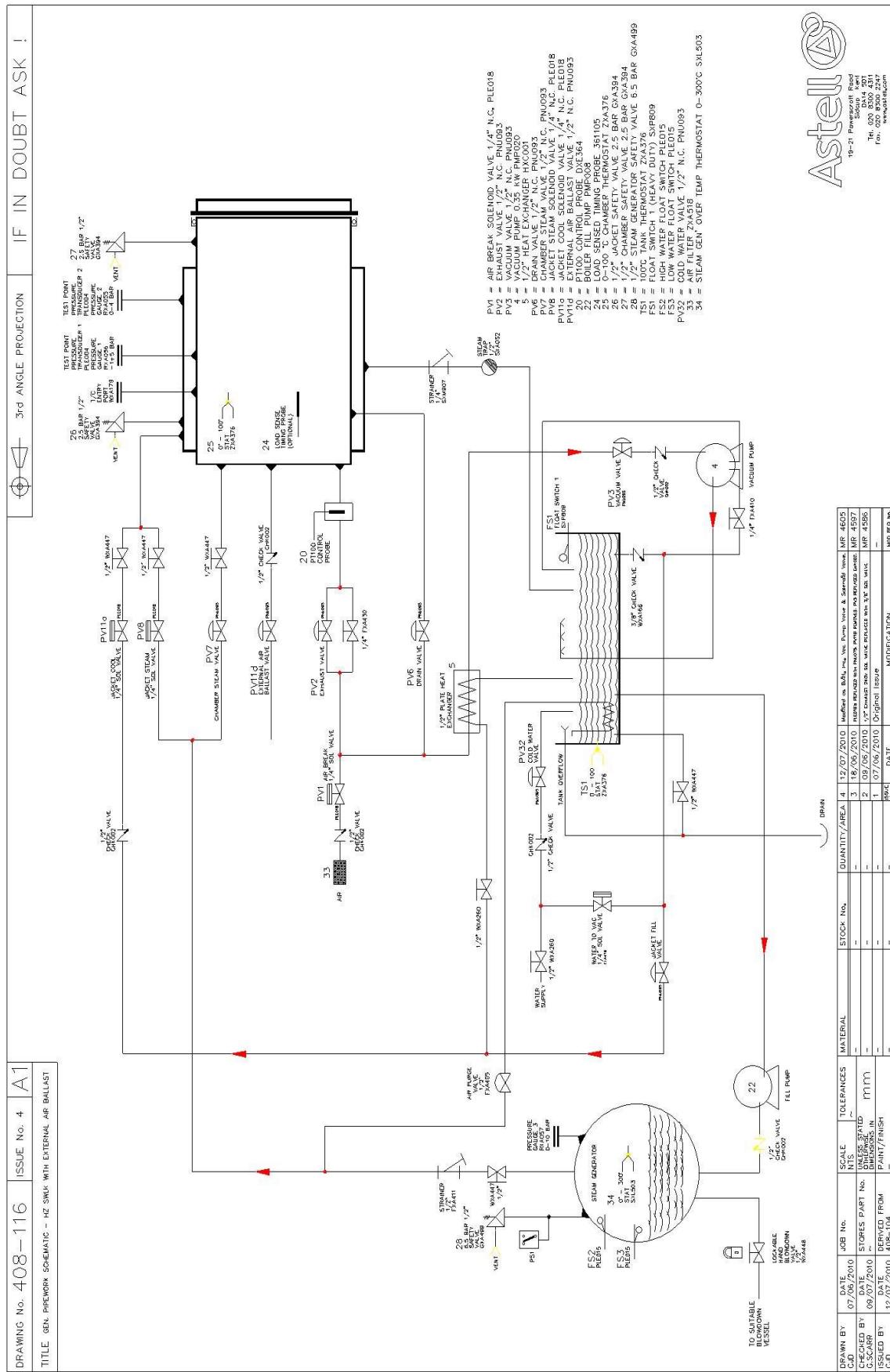
Note:-This chart is for checking Pressure/Temperature Steam Correlation only & is appropriate for Press/ Temp. instruments specified as individually accurate to +/- 1% . It should not be used as a calibration standard for Pressure or Temperature indicators, which must be calibrated in accordance with the Manufacturer's Specifications.

Flow Schematic Drawing Electrically heated [Int Steam gen.]

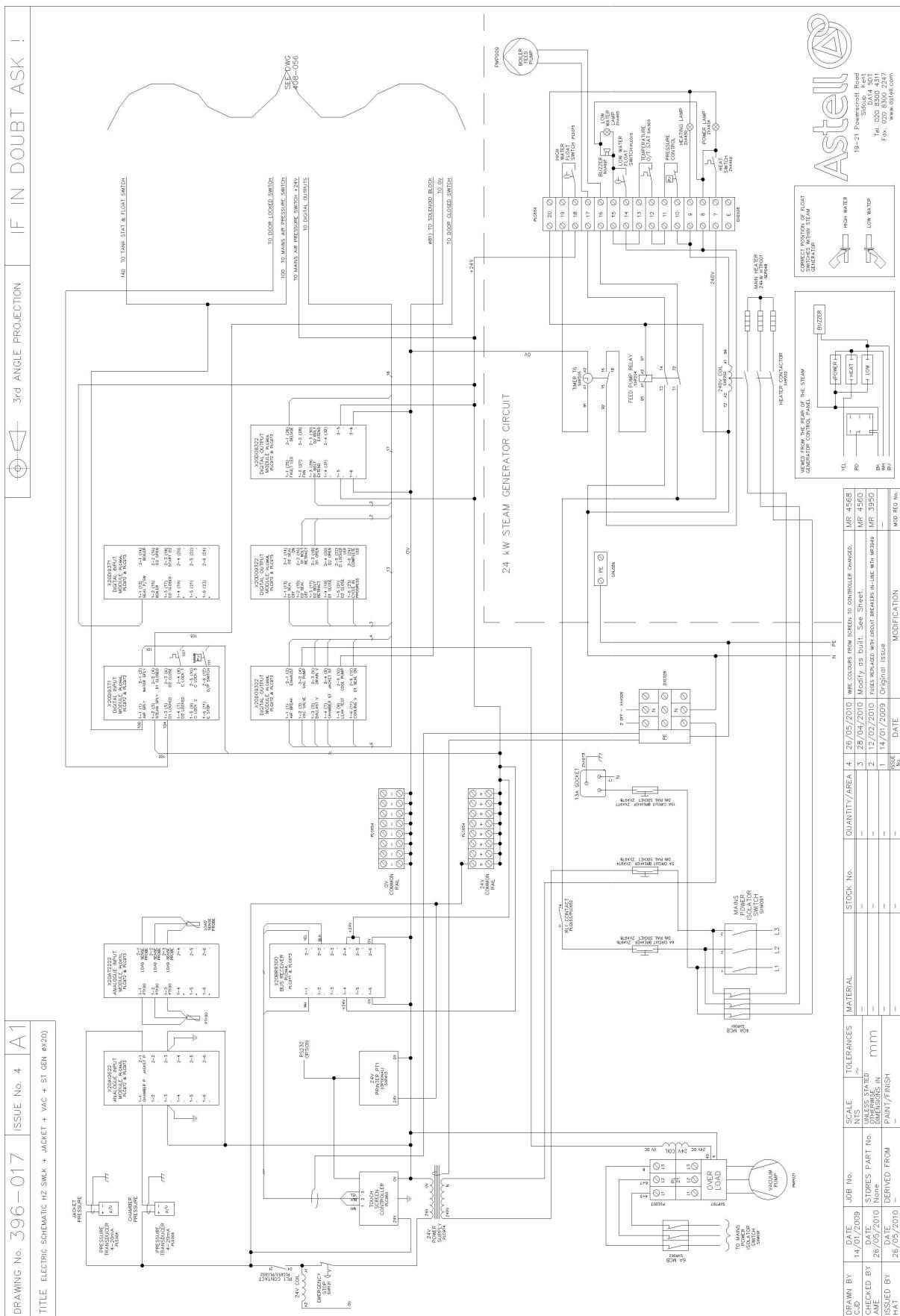


Flow Schematic Drawings

External Steam heated



Electrical Schematic Swiftlock + Jacket and Internal Steam generator



External Steam Heated models omit Steam Generator section

Mxn738 / AppendixA

Default Settings for Program Parameters

The following pages give factory settings for different versions of this machine

- In each case it is assumed the Unit is fitted with the optional printer.

A1 Vacuum Swiftlock Frontload & Heated Jacket(v01)

A2 Vacuum Swiftlock Frontload No Heated Jacket(v00)

A3 Vacuum Swiftlock Frontload Double End & Heated Jckt(v00)

A4 Vacuum Swiftlock Frontload Double End No Heated Jckt(v00)

**For Versions not included here please contact Astell
Scientific for advice**

MXN738 Appendix A1**MODEL= Vacuum Swiftlock Frontload & Heated Jacket(v01)**

PARAMETER	Fabrics <i>P1</i>	Empty Glassware <i>P2</i>	Plastic Discard <i>P3</i>	Fluid Discard <i>P4</i>	Media <i>P5</i>
<u>PRE-VACUUM</u>					
Monitor time	30m	30m	30m	30m	30m
Hold time	3m 0s	0m 30s	0m 30s	0m 30s	3m 0s
Set Pressure	200mBar	200mBar	200mBar	300mBar	200mBar
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar
Pressure Timer	0m 30 s	0m 0 s	0m 0 s	0m 0 s	0m 30 s
<u>NEGATIVE PULSING</u>					
Monitor time	30m	30m	30m	30m	30m
Dwell time	3000s	3000s	3000s	3000s	3000s
Set Pressure HI	800mBar	800mBar	800mBar	700mBar	700mBar
Set Pressure LO	300mBar	300mBar	300mBar	300mBar	400mBar
Pulse Count	2	3	2	3	3
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar
<u>POSITIVE PULSING</u>					
Monitor time	30m	X	30m	X	X
Dwell time	3000s	X	3000s	X	X
Set Pressure HI	1800mBar	X	1800mBar	X	X
Set Pressure LO	1100mBar	X	1100mBar	X	X
Pulse Count	2	X	2	X	X
Drain Valve	Yes	X	Yes	X	X
Jacket	Yes 2100mBar	X	Yes 2100mBar	X	X
<u>HEAT TO STERILISE</u>					
Monitor time	60m	30m	60m	60m	30m
Print interval	1m	1m	1m	1m	1m
Stabilize time	0m 30s	0m 30s	0m 30s	0m 30s	0m 30s
Overshoot Press	0mBar	0mBar	0mBar	0mBar	0mBar
Overshoot set Pt	0C	0C	0C	0C	0C
Overshoot Probe	Vent	Vent	Vent	Vent	Load
Drain Valve	No	No	No	No	No
Vacuum Valve	Yes	Yes	Yes	Yes	Yes
Vacuum Pump	No	No	No	No	No
Ramp Heat	0 steps	0 steps	0 steps	0 steps	0 steps
Ramp Cool	0 steps	0 steps	0 steps	0 steps	0 steps
<u>STERILISING</u>					
Monitor time	60m	30m	60m	60m	90m
Print interval	1m	1m	1m	1m	1m
Pressure Hi	0 mBar	0 mBar	0 mBar	0 mBar	0 mBar
Pressure Low	0 mBar	0 mBar	0 mBar	0 mBar	0 mBar
Sterilise Press	2150mBar	2150mBar	2150mBar	2150mBar	2150mBar
Temperature	121C Safe Stage	121C Safe Stage	121C Safe Stage	121C Safe Stage	121C Safe Stage
Timer	15m 0s	15m 0s	15m 0s	15m 0s	15m 0s
Drain Valve	No	No	No	No	No
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	No

PARAMETER	Fabrics	Empty Glassware	Plastic Discard	Fluid Discard	Media
	P1	P2	P3	P4	P5
Temperature LOAD	0C	0C	121C	121C	121C
Temperature VENT	121C	121C	121C	121C	121C
Vacuum Valve	Yes	Yes	Yes	Yes	Yes
Vacuum Pump	No	No	No	No	No
Variable Mode	No	No	No	No	No
Fo	0	0	0	0	0

VENTING

Monitor Time	X	X	30min	X	X
Vent Pressure	X	X	1600mBar	X	X
Drain Valve	X	X	Yes	X	X
Jacket	X	X	Yes 2100mBar	X	X

COOLING

Monitor time	X	X	X	90m	90m
Print interval	X	X	X	5m 0s	5m 0s
Cool Pump delay	X	X	X	2m 0s	2m 0s
Cool time	X	X	X	20m	20m
Cool override time	X	X	X	30m	30m
Cool Press	X	X	X	1800mBar	1800mBar
Cool Temperature	X	X	X	80C	80C
Jacket	X	X	X	No	No
Ballast Mode	X	X	X	Integral	Integral
Cooling Interlock 1	X	X	X	Yes	Yes
Cooling Interlock 2	X	X	X	No	No
Cooling Interlock 3	X	X	X	No	No
Ramp	X	X	X	0C	0C

DRYING

Monitor time	30m	30m	30m	30m	30m
Hold time	3m 0s	3m 0s	0m 1s	0m 1s	0m 1s
Set Pressure	200mBar	100mBar	500mBar	750mBar	750mBar
Drain Valve	Yes	Yes	Yes	Yes	Yes
Jacket	Yes 2100mBar	Yes 2100mBar	Yes 2100mBar	No	No
Exhaust	Yes	Yes	Yes	No	No

AIR WASH

Monitor time	X	30m	30m	X	X
Pressure Hi	X	700 mBar	700 mBar	X	X
Pressure Low	X	300 mBar	400 mBar	X	X
Pulse Count	X	5	10	X	X
Drain Valve	X	Yes	No	X	X
Jacket	X	Yes 2100mBar	Yes 2100mBar	X	X

AIR BREAK

Monitor time	30m	30m	30m	30m	30m
Air Break time	0m 30s				
Air Break Press	900mBar	900mBar	900mBar	900mBar	900mBar
Exhaust	Yes	Yes	Yes	Yes	Yes

KEY- X = not applicable this program type. (ie this stage not present)

Machine Settings

Vacuum Swiftlock with Heated Jacket

Options		
User Logging	No	
Printer	No	Start
Chart reorder	No	
Bar Coder	No	
Batch No	No	
Load No	No	
Delay Start	No	

Calibration		
Load Probe		
Type	Pt100	
Hardware Filter	50 Hz	
Minimum	17.6C	
Maximum	122C	
Vent probe		
Type	Pt100	
Hardware Filter	50 Hz	
Minimum	0C	
Maximum	150C	
Chamber Pressure		
Minimum	0mBar	
Maximum	4000mBar	
Jacket Pressure		
Minimum	1000mBar	
Maximum	2500mBar	

System		
Temperature Probes Fitted		
Drain/Chamber	No	*
Load	Yes	2
Air Detector	No	*
Vent	Yes	1
Range	0c	150C
Tolerance	1C	5C
Probe type	Pt100	
Hardware Filter	50 Hz	

Pressure Sensors Fitted		
Chamber	Yes	
Jacket	Yes	
Range	0mBar-	3500mBar
Overpressure	3600mBar	

Door Control		
Single Door		
Open/close	1 second	
Fault1 close	60 Seconds	
Fault1 seal	10 Seconds	
Fault 2 close	60 Seconds	
Fault 2 seal	10 Seconds	

Power Fail Mode	Safe	
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Safety Test Mode		
Set Pressure	3800mBar	
Test Frequency	365 days	

Mxn738 / AppendixA

Default Settings for Program Parameters

The following are not included with this edition

- A2 Vacuum Swiftlock Frontload No Heated Jacket(v00)
- A3 Vacuum Swiftlock Frontload Double End & Heated Jckt(v00)
- A4 Vacuum Swiftlock Frontload Double End No Heated Jckt(v00)

Notes Space

This space is for your own notes on the system